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The Tuberculosis Problem in Rhode Island

1920

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THE TUBERCULOSIS PROBLEM IN RHODE ISLAND

A Survey Conducted for the Rhode Island Tuberculosis Association

BY

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ASSISTED BY

WILLIS E. CHANDLER

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Mr. Frank N. Phillips,
President, Rhode Island Tuberculosis Association,
Providence, R. I.

Dear Mr. Phillips:

I am enclosing herewith a report on the tuberculosis problem in Rhode Island, prepared in accordance with a request made last spring by the executive committee of the Rhode Island Tuberculosis Association.

I have attempted in the survey, upon which this report is based, to estimate the extent, and, so far as possible, the character, of the anti-tuberculosis work carried on by various agencies in the State and to measure this work by objective quantitative standards. I have made four visits to Rhode Island, spending two days in the State on each occasion and have visited the principal clinics, hospitals and nursing centers of the State and interviewed the leaders in the anti-tuberculosis movement in Providence, Pawtucket, Woonsocket, Newport, the Pawtuxet Valley and Wallum Lake. The statistical material has been prepared in accordance with my suggestions by Mr. Willis E. Chandler, the executive secretary of your association, and I wish to express my warm appreciation of the faithful and effective work which he has done in collecting and analyzing it. I wish also to record my gratitude for the assistance rendered by the officials of the State Board of Health, the State Sanatorium at Wallum Lake, the City Health Department of Providence, the Providence District Nursing Association, the Providence Tuberculosis League, and of many other medical and nursing organizations throughout the State, who have courteously furnished me with data, in some cases at very considerable expenditure of time and trouble.

On the basis of my findings I have attempted to formulate a general program for the development of anti-tuberculosis work in Rhode Island, which I trust may receive the consideration of your association, and of the other official and private agencies engaged in this campaign. I believe that the suggestions made are moderate and conservative; but I think that, if adopted, they will lay the foundation for the development of an anti-tuberculosis program

in advance of any that has yet been carried out on a state-wide basis. Rhode Island has unusual opportunities for building a complete tuberculosis program, in view of its excellent sanatorium and of the fine clinic and nursing service which has been organized in the city of Providence. These opportunities are not, however, at present fully utilized and the unusually high tuberculosis death rate of the State makes it imperatively necessary that action should be taken to improve existing conditions. Rhode Island has the opportunity to set an example,—to show what can really be accomplished in the saving of human life by a co-ordinated and effective modern anti-tuberculosis program. If your association can secure the co-operation of the State and local officials, and of the private agencies, in bringing about this result it will have rendered a great service, not only to the State but to the country as a whole.

Yours very sincerely,

C.-E. A. WINSLOW.

I. THE PRESENT STATUS OF THE CAMPAIGN AGAINST TUBERCULOSIS.

The official campaign against tuberculosis in the United States began in organized and definite fashion with the program formulated (under the inspiration of Dr. Hermann Biggs) by the New York City Health Department in 1894. The movement spread beyond the field of administrative effort and became a far-reaching popular propaganda, with the organization of the National Tuberculosis Association in 1904.

At the time the national association was formed the attempt to control tuberculosis was regarded as on the road to phenomenal success. The death-rate from all forms of this disease in the Registration Area had decreased from 326.2 in 1880 to 201.2 in 1900. Dr. Samuel W. Abbot, Secretary of the Massachusetts State Board of Health, predicted that tuberculosis sanatoria would some day remain, like the pest-houses of the middle ages, as monuments to a disease which was only of historical interest. Today the situation is a very different one. The reduction in the death-rate has slackened. A remarkable drop did indeed take place in 1919, for reasons which cannot be evaluated until full statistical data for both 1919 and 1920 are available. Between 1910 and 1918, however, the rate for the Registration Area, for tuberculosis of all

forms, fell only from 160.3 to 148.0. A certain apathy has crept over the unofficial organizations created to deal with this problem; and the health departments of most states and cities place little stress upon this disease in their administrative programs. Among leading experts on tuberculosis there has developed an attitude of uncertainty in regard to the fundamental scientific basis of the whole campaign against this disease,— a tendency to attribute past reductions to hypothetical alterations in the biological characteristics of the tubercle bacillus or the human being or to general alterations in social and economic conditions,—and a scepticism as to the feasibility of taking any definite steps at all toward the purposeful control of tuberculosis.

A full survey of available scientific knowledge, and of accumulated practical experience, does not appear to justify an attitude of *non possumus*. It seems clear from recent researches that in most urban and semi-urban communities the vast majority of children acquire infection with human or bovine tubercle bacilli before the age of fifteen years. A certain proportion succumb to massive infection during this period, since in individuals unprotected by mild chronic infection tuberculosis runs a rapid and fatal course. The actual number of deaths from tuberculosis of all forms in New York City between 1913 and 1917 was greater under 1 year of age than for any other year of life outside of the quinquennium, thirty-five to thirty-nine. In England and Wales, for the same period, the number of deaths under 1 year of age was vastly in excess of that recorded for any other year of life. Individuals who do not succumb in infancy or childhood acquire a relative immunity; and tuberculosis in adult life results from a breakdown of this immunity, due to a lowering of general vital resistance, or perhaps to an unduly heavy new infection from without. We may avoid on the one hand the extreme view that tuberculosis in adults is never due to fresh infection of external origin; and we may perhaps doubt the supreme importance placed on the hospital isolation of advanced cases by others. The safe middle course is to conclude that exposure to massive infection, either with the human or the bovine bacillus, is probably dangerous to adults and is certainly dangerous to children. In order to deal effectively with this factor of infection we need to secure:

(a) The pasteurization of all milk used by children, except that from tuberculin-tested herds.

(b) The education of all open human cases of tuberculosis in regard to the steps necessary for the protection of family and associates from infection.

(c) The provision of hospitals for the care of patients who cannot be kept at home without danger to others, and particularly to children.

(d) The forcible isolation of the few individuals who wilfully or carelessly fail to take the precautions necessary for the safeguarding of others.

Passing from the problem of infection to that of resistance, it is clear that in settled communities the vast majority of healthy adults have acquired a relative immunity to tuberculosis and it is highly probable that a failure of vital resistance is in most cases the determining factor, which transforms a latent infection into active clinical disease. Overwork, underfeeding, illness of other types, alcoholism, industrial dusts, these are the chief agents which cause the lighting up of isolated local lesions into an acute disease process. In dealing with adult tuberculosis, in communities where tuberculous infection is common, the development of general and individual resistance is our chief weapon. The following measures are essential to this portion of the program:

1. For the community as a whole;

(e) The building up of vital resistance among the individual members of the community by maintaining a high social and economic standard of living.

(f) The dissemination of knowledge in regard to personal hygiene, including the hygiene of nutrition, air conditioning, exercise and rest, and of a knowledge of the early signs and warnings of tuberculous disease.

(g) The control of industrial processes which involve the exposure of the worker to hard crystalline dusts, a hazard of the first importance as a contributory factor in tuberculosis.

2. For the infected individual;

(h) The prompt detection, through skilled private medical attendance and ample free dispensary service, of cases of tuberculosis in their early and curable stages.

(i) Organized machinery for searching out probably infected individuals in the entourage of known cases and for bringing such individuals to physicians or dispensaries for prompt examination.

(j) The systematic supervision of patients living in their homes, through regular contact with dispensaries and through regular visits for home instruction by trained public health nurses.

(k) Sanatorium treatment for all patients who cannot maintain a high standard of hygienic living in the home.

(l) Supervision by public health nurses of all cases discharged from sanatoria and the provision for such cases of an environment in which normal family life may be maintained with a maximum of self-support, and yet in a physical and social environment which permits and facilitates hygienic living.

The program outlined above is essentially implied in the more modern legislation regarding tuberculosis. Thus Sir Arthur Newsholme (Public Health and Insurance) says,

"Under the English Tuberculosis Regulations the medical officer of health or an officer of the local authority acting under his instructions is required to make such inquiries and take such steps as may be necessary or desirable for investigating the source of infection, for preventing the spread of infection, and for removing conditions favourable to infection. The action required includes *inter alia*

1. Attention to the personal hygiene of the patient, including instruction in the necessary precautions as to coughing and expectoration.
2. Any assistance needed to ensure for the patient
   (a) Skilled medical attendance and nursing as required while he is treated at home;
   (b) Institutional treatment when required;
   (c) Supplementation of the convalescent patient's funds, when needed, to obviate the necessity for him at once to embark in full-time work; to provide additional bedroom accommodation when needed; and to ensure that the patient and his family are not undernourished or overworked.
3. Remedial action for any insanitary conditions of the home, such as uncleanliness, dampness, overcrowding; or of the patient's workplace, especially for dusty occupations.
4. Examination of home contacts with the patient."

As yet however such a program remains little more than a counsel of perfection,—at least in the United States. We are not securing general pasteurization of milk. We are not controlling careless

consumptives, or officially supervising tuberculous patients of any group. We are not systematically detecting incipient tuberculosis. We are getting our cases into sanatoria too late, and sending them out too early. We are failing to provide the essential conditions of after care. We may say of the anti-tuberculosis program as the philosopher said when told that Christianity had failed, "It has not failed. It has never been tried."

The Health and Community Demonstration at Framingham, Massachusetts, is the first thoroughgoing attempt to carry out a complete anti-tuberculosis program; and the death rate in Framingham has fallen from 121.5 between 1907 and 1916 to 79.8 for 1917–1920. (Last four months of 1920 missing.)

The results obtained in this instance are not as yet conclusive; for the period of four years is too short to avoid the possibility of statistical errors in so small a community. Yet, as they stand, the Framingham data are most encouraging; and they are in entire accord with the conclusions to be drawn from a consideration of the whole body of our present knowledge. The general program outlined above is indicated, by theoretical considerations and practical experience, as essential to success in dealing with tuberculosis, and as calculated to bring definite and tangible results if carried out with reasonable effectiveness.

II. THE INCIDENCE OF TUBERCULOSIS IN RHODE ISLAND.

Tuberculosis (of all forms) caused between 10.4 and 11.0 per cent of all the deaths in the state of Rhode Island for each of the eight years, 1910 to 1917. In 1918 the ratio fell to 8.6 per cent on account of the large number of deaths from influenza and pneumonia. In this latter year (1918) tuberculosis was the third greatest factor in the death-rate. In 1912, 1914, 1915 and 1916 it stood second to heart disease. In 1910, 1911, 1913 and 1917 it caused more deaths than any other disease. The control of tuberculosis continues therefore to be a social problem of the first magnitude.

In attempting an exact analysis of tuberculosis mortality in Rhode Island we were confronted by serious difficulties, since both of the factors upon which mortality tables depend,—population and reports of deaths,—were subject to some uncertainty.

In estimating the population of the state and of its various political divisions we have at our disposal the results of three censuses, the Federal censuses of 1910 and 1920, and the State census of 1915. The Federal census of 1910 indicated a total population for the state of 542,610. The state census of 1915, which local authorities believe was conducted in a thorough and conservative fashion, gave the state a population of 595,986, an increase of 53,000 in five years. The Federal census of 1920 revealed a population of 604,397, an increase of less than 9000 for the second quinquennium. The accuracy of the 1920 enumeration is questioned by local authorities and it is believed by many that on account of the severe winter weather during which the count was made many individuals and families were overlooked. In estimating the populations for intervening years one might compute from the 1910 and 1915 enumerations, ignoring the last Federal census, or from the two Federal censuses alone, ignoring the State census, or one might use all three. I have chosen the latter course as the lesser of three evils, feeling that the Federal census of 1920 could scarcely be dismissed from consideration since it will certainly be used for official statistical analyses in the future. On the other hand there seems good reason to believe that the State census of 1915 was essentially correct. The population for each administrative unit for the years 1910 to 1920 has therefore been computed by Mr. Chandler on an arithmetical basis, using all three enumerations, and the results are presented in Table I below. The effect of the discordant results of the two last censuses is of course to produce the effect of a rapid rate of increase in population between 1910 and 1915 (about 10,000 a year for the state as a whole) with a slow rate of increase between 1915 and 1920 (less than 2000 a year for the state as a whole). For the city of Providence an increase of 4600 a year is indicated for the first quinquennium, and a *decrease* of 2000 for the second quinquennium. It is possible that this represents fairly well the actual facts, since vital statisticians recognize a similar reduction in the normal growth of the population of other states and cities as a result of decreased immigration, and increased mortality due to the war and the influenza epidemic. The results of the computation of population made by Mr. Chandler on the basis of the three censuses are presented in Table I.

TABLE I.

Population of Rhode Island.

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920
The State	542610	553285	563960	574635	585310	595986	597668	599350	601032	602714	604397
Bristol County											
Barrington	2452	2558	2664	2770	2876	2982	3165	3348	3531	3714	3897
Bristol	8565	8912	9259	9606	9953	10302	10517	10732	10947	11162	11375
Warren	6585	6716	6847	6978	7109	7241	7361	7481	7601	7721	7841
	17602	18186	18770	19354	19938	20525	21043	21561	22079	22597	23113
Kent County											
Coventry	5848	5813	5778	5743	5708	5669	5669	5669	5670	5670	5670
East Greenwich	3420	3457	3494	3531	3568	3604	3542	3480	3418	3356	3290
Warwick	11983	12246	12509	12772	13035	13302	13338	13374	13410	13446	13481
West Warwick	14646	14873	15100	15327	15554	15782	15718	15654	15590	15526	15461
West Greenwich	481	487	493	499	505	509	481	453	425	397	367
	36378	36876	37374	37872	38370	38866	38748	38630	38513	38395	38269
Newport County											
Jamestown	1175	1244	1313	1382	1451	1518	1541	1564	1587	1610	1633
Little Compton	1276	1297	1318	1339	1360	1382	1383	1384	1385	1386	1389
Middletown	1708	1765	1822	1879	1936	1992	2013	2034	2055	2076	2094
Newport	27149	27814	28479	29144	29809	30472	30429	30386	30343	30300	30255
New Shoreham	1314	1334	1354	1374	1394	1414	1339	1264	1189	1114	1038
Portsmouth	2681	2680	2680	2679	2678	2678	2661	2644	2627	2610	2590
Tiverton	4032	4108	4184	4259	4336	4409	4306	4203	4100	3997	3894
	39335	40242	41150	42056	42964	43865	43672	43479	43286	43093	42893
Providence County											
Burrillville	7878	7920	7962	8004	8046	8086	8190	8294	8398	8502	8606
Central Falls	22754	22945	23136	23327	23518	23708	23802	23896	23989	24083	24174
Cranston	21107	22274	23441	24608	25775	26940	27433	27926	28419	28912	29407
Cumberland	10107	10072	10037	10002	9967	9929	9958	9987	10016	10045	10077
East Providence	15808	16363	16918	17473	18028	18584	19225	19866	20507	21148	21793
Foster	1124	1115	1106	1097	1088	1076	1042	1008	974	940	905
Glocester	1401	1422	1440	1458	1476	1491	1471	1451	1431	1411	1389
Johnston	5935	6087	6238	6391	6542	6693	6725	6757	6789	6821	6855
Lincoln	9825	9889	9953	10017	10081	10149	10028	9907	9786	9665	9543
North Providence	5407	5681	5955	6229	6503	6780	6963	7146	7329	7512	7697
North Smithfield	2699	2720	2741	2762	2783	2805	2884	2963	3042	3121	3200
Pawtucket	51622	52364	53106	53848	54590	55335	57117	58899	60681	62463	64248
Providence	224326	228992	233658	238324	242990	247660	245647	243634	241621	239608	237595
Scituate	3493	3463	3433	3403	3373	3342	3275	3208	3141	3074	3006
Smithfield	2739	2848	2957	3066	3175	3284	3267	3250	3233	3216	3199
Woonsocket	38125	38515	38905	39295	39685	40075	40759	41443	42127	42811	43496
	424353	432670	440986	449304	457620	465397	467786	469635	471483	473332	475190
Washington County											
Charlestown	1037	1010	983	956	929	901	873	845	817	789	759
Exeter	778	803	828	853	878	904	929	954	979	1004	1033
Hopkinton	2324	2358	2392	2426	2460	2496	2460	2424	2388	2352	2316
Narragansett	1250	1286	1322	1358	1394	1431	1344	1257	1170	1083	993
North Kingstown	4048	4025	4002	3979	3956	3931	3825	3719	3613	3507	3397
Richmond	1633	1598	1563	1528	1493	1458	1423	1388	1353	1318	1301
South Kingstown	5176	5240	5304	5368	5432	5497	5434	5371	5308	5245	5181
Westerly	8696	8991	9286	9581	9876	10175	10131	10087	10043	9999	9952
	24942	25311	25680	26049	26418	26793	26419	26045	25671	25297	24932

Our second problem was to determine the number of deaths from tuberculosis which could properly be credited to each political unit for each of the years covered by our study. In order to obtain accurate data it was necessary to redistribute the deaths occurring in institutions for the care of tuberculosis, so that they might be charged to the city or town where the patient resided and was taken ill. Mr. Chandler has therefore gone over in detail all the records for the past ten years at Wa lum Lake, Hillsgrove and Cranston, and at the City and Rhode Island Hospitals in Providence and, after assigning each death to its place of legal residence, has obtained the data presented in Table II, which we believe give a true picture of the actual variations in the ncidence of tuberculosis within the state.

In order to gain an idea of the general incidence of tuberculosis in Rhode Island we have compared the figures for each year with corresponding statistics for the Registration Area in general and for the State of Connecticut, which should furnish a reasonably fair basis of comparison on account of general similarity in climate and in racial and social and economic conditions.

TABLE II.

Deaths in Rhode Island from all forms of Tuberculosis, with Computed Death Rates.

Residence	1910	Per 1000 population	1911	Per 1000 population	1912	Per 1000 population	1913	Per 1000 population	1914	Per 1000 population	1915	Per 1000 population	1916	Per 1000 population	1917	Per 1000 population	1918	Per 1000 population	1919	Per 1000 population	Average for 10 years per 1000 population
Barrington	....	....	2	.78	1	.38	1	.36	2	.70	1	.33	1	.31	2	.59	1	.28	3	.79	.45
Bristol	17	1.98	20	2.24	10	1.08	18	1.87	15	1.51	19	1.84	27	2.56	17	1.58	20	1.82	25	2.22	1.87
Burrillville	11	1.39	8	1.01	13	1.63	12	1.50	16	1.98	9	1.11	14	1.71	16	1.92	24	2.85	11	1.29	1.64
Central Falls	33	1.45	41	1.78	40	1.72	29	1.24	49	2.08	34	1.44	49	2.06	31	1.30	42	1.75	42	1.74	1.65
Charlestown	....	....	....	....	2	2.03	....	....	....	....	1	1.11	....	....	....	....	....	....	....	....	.31
Coventry	11	1.88	10	1.72	7	1.21	6	1.05	10	1.75	9	1.59	4	.71	12	2.12	8	1.41	8	1.41	1.49
Cranston	15	.71	19	.85	26	1.11	26	1.06	32	1.24	17	.63	27	.98	25	.89	36	1.26	26	.88	.96
Cumberland	18	1.78	17	1.69	19	1.89	18	1.80	11	1.10	18	1.81	16	1.61	15	1.50	14	1.40	13	1.29	1.59
East Greenwich	5	1.46	1	.29	7	2.00	4	1.13	7	1.96	4	1.11	2	.51	11	3.18	6	1.77	1	.30	1.37
East Providence	27	1.71	31	1.89	27	1.60	29	1.66	24	1.33	19	1.02	22	1.14	26	1.30	38	1.83	36	1.68	1.52
Exeter	2	2.57	....	....	....	....	....	....	1	1.14	....	....	....	....	....	....	4	4.04	3	2.94	1.07
Foster	1	.89	1	.90	....	....	3	2.74	3	2.76	1	.93	....	....	1	.99	....	....	3	3.19	1.24
Glocester	....	....	1	.70	1	.69	2	1.37	....	....	4	2.68	2	1.38	3	2.07	2	1.40	1	.71	1.10
Hopkinton	4	1.72	2.00	.85	2	.84	....	....	....	....	1	.40	4	1.63	4	1.65	3	1.26	1	.42	.88
Jamestown	1	.85	1	.80	....	....	1	.72	....	....	....	....	....	....	1	.64	....	....	....	....	.30
Johnston	10	1.68	6	.99	4	.64	4	.63	7	1.07	6	.90	6	.89	8	1.18	14	2.06	4	.59	1.06
Lincoln	20	2.03	21	2.12	11	1.10	15	1.50	18	1.78	15	1.48	16	1.60	12	1.21	19	1.95	13	1.35	1.61
Little Compton	....	....	1	.77	1	.76	....	....	....	....	2	1.45	2	1.45	3	2.17	....	....	2	1.44	.80
Middletown	2	1.17	....	....	....	....	2	1.06	....	....	2	1.00	3	1.49	1	.49	1	.48	2	.96	.67
Narragansett	3	2.40	6	4.67	....	....	1	.74	1	.72	....	....	....	....	3	2.43	3	2.63	....	....	1.36
Newport	47	1.73	45	1.61	34	1.19	31	1.06	31	1.04	27	.89	49	1.61	45	1.48	36	1.19	42	1.39	1.32
New Shoreham	1	.76	2	1.50	....	....	....	....	....	....	1	.71	....	....	2	1.60	2	1.71	1	.92	.72
North Kingstown	1	.25	5	1.24	2	.50	7	1.76	5	1.26	5	1.27	7	1.84	2	.54	7	1.96	5	1.45	1.21
North Providence	6	1.11	5	.90	8	1.34	9	1.44	12	1.84	6	.89	5	.72	9	1.26	15	2.04	10	1.33	1.29
North Smithfield	4	1.48	2	.74	9	3.28	3	1.08	4	1.44	4	1.43	5	1.73	4	1.35	3	.99	3	.96	1.45
Pawtucket	97	1.88	99	1.89	78	1.47	89	1.65	91	1.67	81	1.46	79	1.37	84	1.42	112	1.83	74	1.17	1.58
Portsmouth	3	1.12	....	....	4	1.49	3	1.12	5	1.87	3	1.12	1	.38	3	1.14	1	.38	3	1.15	.98
Providence	478	2.13	437	1.91	439	1.88	466	1.96	438	1.80	476	1.92	498	2.03	512	2.10	524	2.17	413	1.73	1.96
Richmond	....	....	4	2.50	3	1.92	5	3.93	2	1.35	3	2.06	1	.70	1	.72	1	.74	....	....	1.39
Scituate	5	1.43	5	1.44	4	1.17	5	1.47	7	2.08	4	1.20	5	1.52	9	2.81	2	.64	2	.65	1.44
Smithfield	4	1.46	6	2.11	1	.34	3	.98	4	1.26	8	2.44	4	1.22	2	.61	3	.93	3	.93	1.23
South Kingstown	7	1.35	6	1.15	12	2.26	1	.19	3	.55	8	1.46	5	.92	7	1.31	6	1.13	10	1.92	1.22
Tiverton	1	.25	4	.97	7	1.67	14	3.29	7	1.62	7	1.59	10	2.33	4	.96	6	1.47	8	2.02	1.62
Warren	7	1.06	16	2.38	9	1.31	9	1.29	7	.98	12	1.66	10	1.36	11	1.47	9	1.18	10	1.29	1.40
Warwick	49	1.84	47	1.73	44	1.59	52	1.85	15	1.15	16	1.20	26	1.95	7	.52	17	1.27	18	1.34	1.59
West Warwick	....	....	....	....	....	....	....	....	23	1.48	37	2.34	27	1.72	26	1.66	25	1.61	25	1.61	
Westerly	10	1.15	9	1.00	9	.97	14	1.46	13	1.32	15	1.47	11	1.09	9	.89	14	1.50	13	1.30	1.22
West Greenwich	....	....	2	4.11	....	....	1	2.00	....	....	....	....	....	....	1	2.24	2	4.83	1	2.61	1.58
Woonsocket	81	2.12	68	1.77	68	1.75	53	1.35	72	1.81	68	1.70	77	1.89	81	1.97	74	1.75	51	1.18	1.73
Outside State	1	....	1	....	2	....	4	....	3	....	4	....	4	....	5	....	....	....	....	....	....
	982	1.81	951	1.72	904	1.60	941	1.64	938	1.60	947	1.59	1019	1.70	1015	1.69	1094	1.82	886	1.47	1.66

TABLE III.

Mortality from All Forms of Tuberculosis in Rhode Island, in Connecticut, and in the Registration Area.

Deaths per 100,000.

Year	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
R. I.	181	172	160	164	160	159	170	169	182	147
Conn.	150	148	142	140	146	139	139	153	146	116
Reg. Area	160	159	149	148	147	146	142	146	148	...

Table III and Fig.1 indicate a marked and continuous excess in the tuberculosis death rate of Rhode Island, as compared with both the State of Connecticut and the Registration Area as a whole. In view of the assumption that the 1920 population estimates were abnormally low I have calculated what the population of the state would have been in 1919 if the rate of increase indicated by the 1910 and 1915 censuses had been continued. Using the annual increment of 10,675 indicated by the two earlier enumerations we obtain the following populations: 1916, 606,661; 1917, 617,336; 1918, 628,011; 1919, 638,686. On the basis of these populations we have computed the mortality rates indicated for 1916 1919 by the dotted lines in Fig. 1. Even on this basis it is clear that the tuberculosis death-rate of Rhode Island has been consistently about 20 per 100,000 higher than that for the State of Connecticut or the Registration Area as a whole. It is very probable that this excess is due to differences in racial, social or economic conditions rather than to relative inadequacy in the machinery available for combating the disease. Rhode Island is an intensively urban state with an unusually large foreign born population. According to the 1910 census, for example, 67.7 per cent of the population of Rhode Island lived in cities of over 25,000 population against 48.5 per cent in the case of Connecticut; while native whites of native parentage made up a smaller proportion of the population (29.5 per cent against 35.5 per cent) native whites of foreign or mixed parentage a larger proportion (35.9 per cent against 33.6 per cent), and foreign born whites a larger proportion (32.8 per cent against 29.5 per cent); Rhode Island in each case being compared with Connecticut.

Whatever may be the cause of the conditions which exist, the problem remains; and it is clear that Rhode Island faces, in dealing with tuberculosis, a problem which is not only intrinsically of large magnitude but one which is relatively more serious than that of neighboring states.

TUBERCULOSIS DEATH RATE

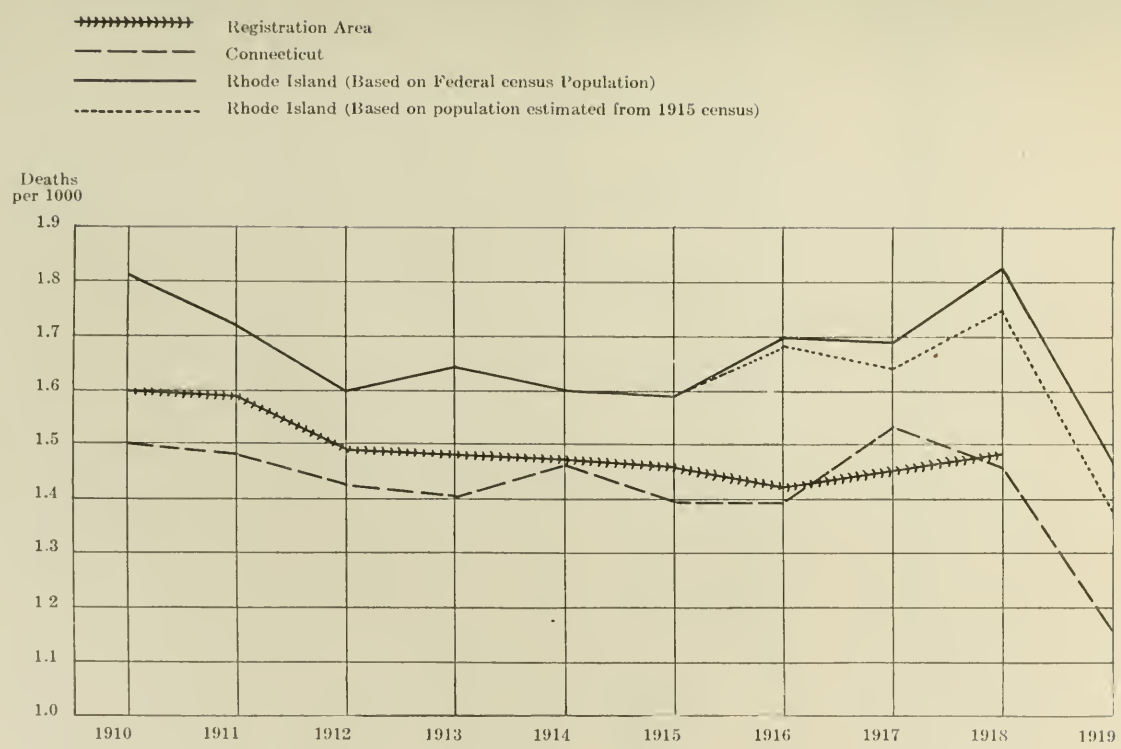


FIG. 1.

In order to indicate more clearly the variations in incidence of tuberculosis among the various political subdivisions of the state the rates for the six principal cities and for the rest of the state have been computed in Table IV for the two quinquennia, 1910–1914 and 1915–1919, and for the whole decennial period. It appears from these figures that the rate in Providence has been materially higher than that recorded for any other section of the state (196) with Woonsocket second (173), and Central Falls (165), and Pawtucket (158) third and fourth respectively. The combined smaller towns of the state have a rate well below the average (137), while Newport (132) and Cranston (96) exhibit an even more favorable

TABLE IV.

Average Death Rate from all Forms of Tuberculosis.

	Providence	Pawtucket	Woonsocket	Newport	Cranston	Central Falls	Rest of State
1910–1914	194	171	176	133	100	165	141
1915–1919	199	145	170	131	93	166	133
1910–1919	196	158	173	132	96	165	137

record. Marked reductions in the second quinquennium, as compared with the first, are shown only in Pawtucket, the small towns, and Cranston. Pawtucket is one of the few areas in the state which showed a marked gain in population in 1920, and if this census was greatly in error in Providence, Woonsocket and Central Falls, but not in Pawtucket, the observed differences would be in part explained. The data for the quinquennium 1910 to 1914 are in any case of unquestioned validity and they indicate exactly the same relative rank for the six cities as the figures for the whole period.

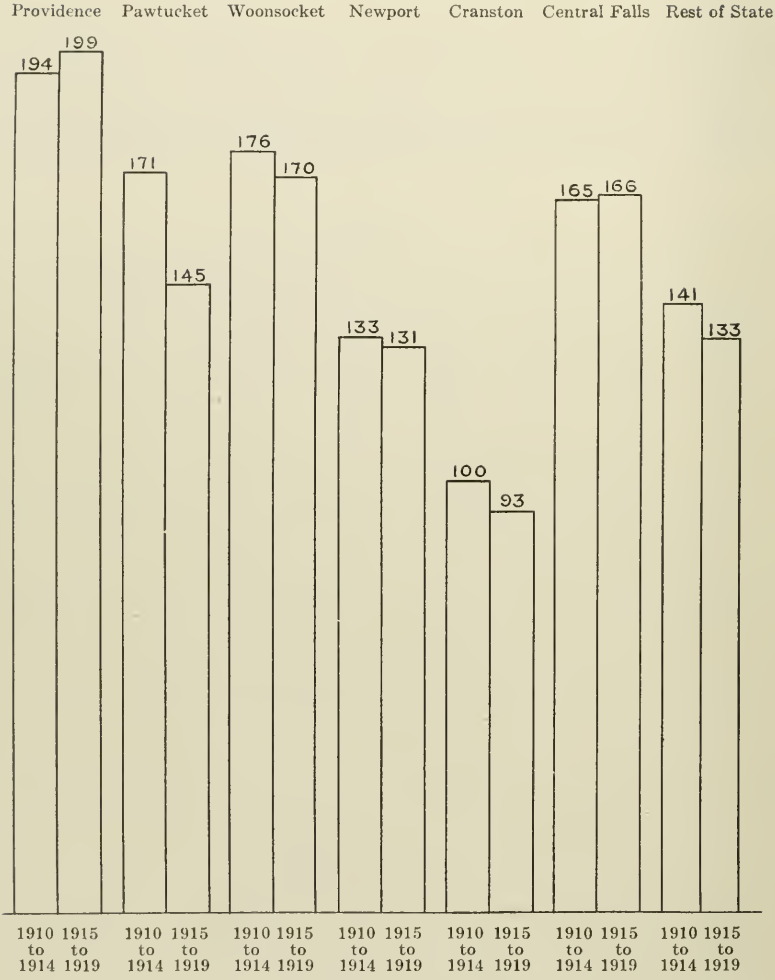
It can not be in any way concluded that the high death rates from tuberculosis in the four cities which lead in Table IV is due to special neglect of anti-tuberculosis measures. On the contrary Providence is better equipped with anti-tuberculosis machinery than any other city and Pawtucket and Woonsocket are better off than Newport or Cranston. The actual fact appears to be that clinical and nursing services have been provided most freely where the need was most acute, but have not yet been provided anywhere in sufficiently effective concentration to effect a material impression upon the mortality rates. It is also probable that the recognition of tuberculosis is better in the cities and that the death rates would

be higher in the small towns if all deaths really due to tuberculosis were diagnosed as such.

In general, the variations in tuberculosis mortality correspond closely to general social and economic conditions. Providence is most highly urbanized and industrialized and shows the highest rate. Pawtucket, Central Falls and Woonsocket naturally fall in a second group, while Newport and the rest of the state are perhaps characterized by a more favorable economic status and are relatively free from the unfavorable conditions of urban life. Assuming, as I do, that the basis of the anti-tuberculosis movement is fundamentally a sound one, two conclusions would seem warranted.

FIG. II.

Tuberculosis Death Rates (per 100,000) Principal Cities.



First, the four largest cities which are now carrying out organized anti-tuberculosis work must increase its volume, and improve its efficiency, if they are to cope with the peculiarly difficult problems created by urban and industrial conditions. I know of no fundamental reason why Providence should suffer from a higher rate than other eastern cities of similar size. Table V and Fig. 3 show the quinquennial averages for New York City and for Providence, New Haven, Rochester and Syracuse, cities of the same general class. Providence stood second to New York only, in 1910 to 1914 and has increased its rate from 1915 to 1919, while New York shows a substantial decrease. All the other three cities were well below Providence in 1910 to 1914 and exhibit definite reductions from 1915 to 1919.

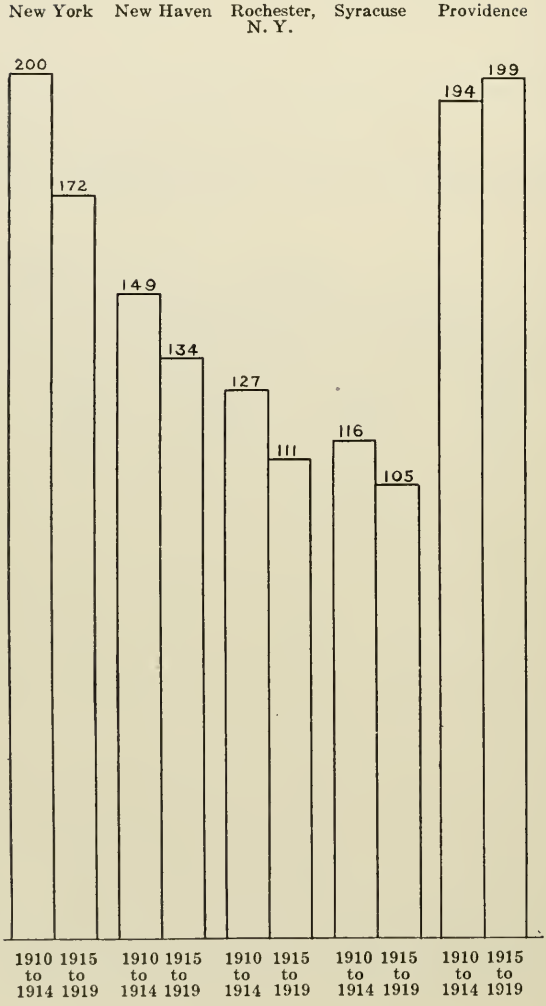
TABLE V.

Comparison of Tuberculosis Mortality (all forms) in Providence and in certain other eastern cities.

City Death rate	New York City	Providence	New Haven	Rochester	Syracuse
1910–1914	200	194	149	127	116
1915–1919	172	199	134	111	105

FIG. III.

Tuberculosis Death Rates (per 100,000)



Secondly, the tuberculosis death rate in Newport and in the small towns of the state, while lower than that for the four large industrial centers, is still high enough to constitute a serious health problem. Even in these relatively favored sections more than one person in every thousand dies every year of tuberculosis and conditions by no means warrant the almost complete neglect of administrative machinery for the control of this disease.

III. ADMINISTRATIVE MACHINERY FOR THE CONTROL OF TUBERCULOSIS IN RHODE ISLAND.

While tuberculosis is a communicable disease, it is clear that it differs widely from the more acute contagia in the relative importance of the parts played, respectively, by the invading microbe and the vital resistance of the human body. The tubercle bacillus is so widely distributed that extreme rigor in administrative control would be as ineffective as it would be unwise. Two measures of control are, however, essential in dealing intelligently with this disease,—a law requiring the reporting of all known cases and a law permitting the isolation of any individual who is known to be a disseminator of tubercle bacilli and who wilfully and habitually refuses to observe the simple precautions necessary to protect his neighbors from the danger of infection. Rhode Island has both these laws upon its statute books, although their enforcement leaves much to be desired.

Tuberculosis was made a reportable disease in the city of Providence by a rule of the Board of Aldermen in 1905. In 1909, however, a state law was passed requiring the reporting of this disease directly to the State Board of Health (Ch. 386). The state law also requires the reporting of tuberculosis, along with other communicable diseases, to the local health officers throughout the state (Ch. 110). In Providence, at least, it has seemed unwise to the local health authorities to require a double reporting of tuberculosis and, since 1909, reports to the city health officer have been allowed to lapse.

Since the control of tuberculosis must be largely a local matter it would be most unfortunate if city and town health officers remained without knowledge of the existence of cases of this disease within their respective jurisdictions. This was at first an unfor-

tunate effect of the law of 1909. Lately, however, transcripts of all reports of cases of tuberculosis made to the State Department of Health have been promptly forwarded to local health officers. So long as this is done, and if the reporting law is effectively enforced, there would seem to be no insuperable disadvantages, and for rural districts certain positive advantages, in a state reporting law.

The general principle that reports should be made to the office which is to exercise control is, however, a sound one. In the smaller towns direct control will have to be exercised by the state, if it is exercised at all. In Providence this is not the case. Without change in the existing law it would be feasible for the State Board of Health to make the City Health Officer its deputy for the collection of reports in Providence. This would give the local office the direct contact with reporting which Dr. Chapin feels to be essential for effective control and after transcription the reports could be forwarded to the State House. I would strongly urge that the State Board of Health make an arrangement of this kind.

That the present reporting law is not being taken at all seriously by the physicians of the state is, however, clearly indicated by the figures for reported cases presented in Table VI. These data, courteously furnished by Dr. B. U. Richards, Secretary of the State Board of Health, when compared with the mortality returns in Table II, show that the reported case rate for nine years averages only 1.40 cases per 1000 population, as compared with a death rate for the same period of 1.66 per 1000. In other words, for each 100 cases reported there were 118 deaths. An idea of what may be expected from a reasonably good enforcement of reporting laws may be gained from the data in Table VII, from the Report of the Massachusetts State Board of Health for 1915. The reporting even here is of course incomplete; but it is more than twice as good as that attained in Rhode Island. The careful studies conducted in Framingham, Mass., by the Framingham Community Health and Tuberculosis Demonstration indicate that as a matter of fact the ratio of existing cases in a given community is about 9 cases to 1 death, and the actual normal case rate about 10 per 1000 population.

That this estimate is applicable to Rhode Island, is indicated by the survey of post-influenza cases conducted by the District Nursing Association after the epidemic of 1918. Out of 1805 persons visited 27, or 15 per 1000, were tuberculous, and since post-influenza

TABLE VI.

Cases of Tuberculosis Reported in Rhode Island.

Residence	1911	Per 1000 population	1912	Per 1000 population	1913	Per 1000 population	1914	Per 1000 population	1915	Per 1000 population	1916	Per 1000 population	1917	Per 1000 population	1918	Per 1000 population	1919	Per 1000 population	Average for 9 years
Barrington	1	.39	3	1.12	2	.72	1	.35	...	....	1	.31	...	....	5	1.39	3	.77	.56
Bristol	6	.67	7	.76	11	1.15	4	.40	21	2.04	18	1.71	17	1.58	23	2.09	22	1.07	1.16
Burrillville	3	.38	8	1.	15	1.87	9	1.12	7	.87	12	1.47	6	.72	7	.83	9	1.05	1.03
Central Falls	15	.65	43	1.86	30	1.29	41	1.74	56	2.36	44	1.85	49	2.05	33	1.37	52	2.16	1.70
Charlestown	..	....	1	.10	1	.10	...	....	...	....	...	....	...	....	...	....	...	....	.02
Coventry	2	.34	8	1.38	8	1.39	4	.70	...	....	1	.18	1	.18	4	.71	9	1.59	.72
Cranston	42	1.89	86	3.67	71	2.89	40	1.55	38	1.41	80	2.91	59	2.14	47	1.64	53	1.82	2.21
Cumberland	2	.19	9	.90	11	1.10	8	.80	11	1.11	14	1.41	5	.50	7	.70	11	1.09	.87
East Greenwich	..	....	2	.57	1	.28	3	.84	2	.55	3	.85	3	.84	...	....	...	....	.44
East Providence	15	.92	17	1.	17	.97	6	.33	15	.81	13	.67	19	.95	26	1.25	33	1.54	.94
Exeter	..	....	..	....	..	....	...	....	...	....	...	....	...	....	...	....	...	....	....
Foster	1	.90	..	....	1	.91	...	....	1	.93	...	....	...	....	...	....	1	1.06	.42
Glocester	..	....	..	....	2	1.37	...	....	2	1.34	...	....	2	1.38	2	1.40	...	....	.61
Hopkinton	..	....	3	1.25	1	.41	1	.41	...	....	1	.41	4	1.66	...	....	2	.86	.56
Jamestown	..	....	1	.76	..	....	...	....	...	....	1	.65	1	.64	...	....	...	....	.23
Johnston	3	.49	3	.48	3	.47	9	1.38	7	1.05	2	.30	4	.59	1	.15	2	.29	.58
Lincoln	4	.40	9	.90	9	.90	5	.49	11	1.08	10	1.	20	2.02	14	1.44	19	1.98	1.13
Little Compton	..	....	..	....	..	....	2	1.46	1	.75	...	....	4	2.89	1	.72	1	.72	.73
Middletown	..	....	1	.55	..	....	...	....	...	....	1	.50	...	....	...	....	1	.48	.17
Narragansett	..	....	..	....	1	.74	...	....	...	....	...	....	...	....	2	1.75	1	.96	.38
Newport	14	.50	23	.81	24	.82	21	.71	25	.82	21	.69	18	.59	19	.63	22	.73	.70
New Shoreham	..	....	..	....	..	....	1	.72	...	....	2	1.50	2	1.60	2	1.71	...	....	.61
North Kingstown	3	.75	1	.25	7	1.76	2	.51	3	.76	...	....	...	....	3	.84	4	1.15	.67
North Providence	..	....	8	1.34	3	.48	12	1.84	5	.74	6	.86	7	.98	5	.68	9	1.20	.90
North Smithfield	..	....	1	.37	2	.72	1	.40	...	....	5	1.73	2	.68	1	.33	2	.64	.54
Pawtucket	31	.59	98	1.85	102	1.89	89	1.63	109	1.97	93	1.62	103	1.74	77	1.26	96	1.52	1.56
Portsmouth	..	....	1	.37	3	1.12	1	.34	5	1.87	2	.75	...	....	...	....	4	1.54	.67
Providence	27	.12	533	2.29	440	1.85	434	1.78	443	1.79	450	1.83	461	1.89	426	1.77	501	2.10	1.71
Richmond	2	1.26	2	1.27	2	1.31	...	....	...	....	...	....	...	....	...	....	...	....	.43
Scituate	3	.87	2	.58	4	1.18	3	.89	...	....	2	.61	2	.62	2	.64	4	1.30	.74
Smithfield	2	.70	..	....	1	.33	4	1.26	6	1.83	...	....	5	1.51	1	.31	7	2.18	.90
South Kingstown	6	1.14	3	.57	2	.37	8	1.47	5	.91	4	.74	3	.56	8	1.51	9	1.73	1.
Tiverton	..	....	3	.72	..	....	1	.21	3	.68	5	1.16	1	.24	5	1.23	2	.51	.53
Warren	7	1.04	9	1.31	10	1.43	3	.42	9	1.24	12	1.63	9	1.20	7	.92	17	2.19	1.26
Warwick	25	.92	34	1.23	23	.82	16	1.22	18	1.35	9	.67	11	.82	10	.74	11	.82	.95
West Warwick	..	....	..	....	..	....	12	.77	11	.69	20	1.27	15	.96	19	1.22	22	1.42	.70
Westerly	8	.89	6	.65	6	.63	4	.41	6	.59	5	.49	7	.68	11	1.10	11	1.10	.73
West Greenwich	..	....	..	....	3	6.02	1	1.99	...	....	...	....	...	....	...	....	3	7.83	1.76
Woonsocket	30	.78	57	1.47	75	1.91	48	1.21	69	1.72	71	1.74	57	1.37	45	1.02	72	1.67	1.43
	252	.45	982	1.74	891	1.55	794	1.36	889	1.49	908	1.52	897	1.50	813	1.35	1015	1.68	1.40

TABLE VII.

Cases and Deaths from Pulmonary Tuberculosis in Massachusetts.

Year	Case Rate per 100,000	Death Rate per 100,000	Fatality Rate. Deaths per 100 cases
1906	100.4	149.1	148.4
1907	143.6	150.6	105.1
1908	183.6	137.4	74.9
1909	244.7	132.7	54.4
1909 (Dec.)	(Case rate and fatality rate for December, 1909, added to year 1909)		
1910	232.6	133.1	57.3
1911	204.1	128.0	62.8
1912	214.2	119.9	56.0
1913	207.6	117.0	56.4
1914	196.2	114.1	58.4
1915	217.0	113.2	52.2

(Report, State Department of Health, Massachusetts, 1915, p. 613)

cases would probably show a tuberculosis incidence somewhat higher than normal, the results may be considered as closely checking the Framingham conclusions. We may assume that about 6000 cases of tuberculosis actually exist in Rhode Island, of which about 1000 are now reported.

In order to gain an idea as to the relative incompleteness of the reporting in various areas we have prepared Table VIII for the years 1911 to 1919. There are several points which should be taken into consideration in interpreting these figures. The death statistics have all been corrected by distributing the deaths occurring in tuberculosis hospitals and sanatoria to the cities and towns of actual residence, but the case rates have not been corrected in this manner. This factor would tend to decrease the ratio of deaths to cases in Providence and in the "rest of the State" (the latter including Cranston and Wallum Lake). On the other hand the deaths which occur in general hospitals would tend to increase unduly the fatality rates in the larger cities. On the whole it seems probable that the data presented indicated particularly lax reporting in Newport and in the "rest of the State," which is exactly what we should expect from the fact that these areas are lacking in organized clinic facilities.

TABLE VII.

Incompleteness of Reporting of Tuberculosis in Various Areas. 1911–1919

	Average Number Cases per year	Average Number Deaths per year	Apparent Fatality Rate. Deaths per 100 Cases.
Providence	412	466	113
Pawtucket	88	87	98
Woonsocket	58	68	117
Central Falls	40	39	97
Newport	20	37	185
Rest of State	208	269	129

With regard to the machinery available for the control of the occasional wilfully careless consumptive, Chapter 110 of the General Laws provides that cases of tuberculosis shall be "suitably quarantined" and the term is defined as meaning "the isolation of the person or persons having the disease or distemper, and of such other persons as may by contact or association with the affected person become, in the judgment of the state board of health, carriers of contagion. The period of time, the manner of such isolation and the method of cleansing and disinfection shall be in accordance with the rules and regulations made from time to time by said Board."

The State Board of Health appears to have made no specific rules and regulations under this act, certain earlier regulations having been presumably superseded by a set of "Rules Governing Control of Contagious Diseases," issued in 1919. The latter document is essentially a transcript of a report on the control of communicable diseases by a committee of the American Public Health Association. This report laid down the general scientific principles underlying the control of such diseases but was not designed in any sense to serve the purpose of a legally enforceable draft of rules and regulations. I am informed that the City Solicitor of Providence holds it necessary for the State Board of Health to make a specific individual ruling in regard to each particular case of tuberculosis to be isolated under Chapter 110,—a procedure which would certainly be intolerable in dealing with more acute disorders but which may perhaps serve for the rare instances in which forced isolation of tuberculosis is desirable.

A third very desirable legal provision is found in Chapter 576 of the Public Laws which prohibits tuberculous persons from handling food products.

Aside from forcible legal control it is essential that the public authorities should offer facilities for the laboratory diagnosis of tuberculosis and this is done by the State Board of Health. Dr. L. A. Round, Director of the Laboratory of the State Department of Health, has courteously furnished us with the data presented in Table IX in regard to the scope and extent of this work for the past six years.

TABLE IX.

Work of the State Laboratory in the Diagnosis of Tuberculosis.
Number of Speciments Examined.

Year	Positive	Negative	Total
1915	501	1705	2266
1916	533	1921	2454
1917	493	1967	2460
1918	348	1752	2100
1919	417	1731	2148
1920 (to Sept. 1)	249	933	1182
Totals	2541	10069	12610

The state law (Chapter 386) requires that the State Board of Health shall keep a register of all reported cases of tuberculosis and this is done. The physicians of the state are provided with report blanks of the form indicated below. A minor point of friction could be eliminated by combining this report blank with the blank which must accompany a sample of sputum sent to the State Laboratory. At present the physician must fill out one form to go with the specimen and later make out the full report blank below which involves apparently unnecessary duplication.

Report of a Case of Tuberculosis to the R. I. State Board of Health.

.....R. I.....19

Name.....

Age.....Sex.....Color..... { Married..... Single..... Widower.....

Residence No..... { Street.....City..... Road.....Town.....

Occupation, trade, profession or particular kind of work.....
General nature of industry, business or establishment in which employed.....
Working in what Shop or Mill, etc., for how long previous to date?.....

Form of Disease: Pulmonary, Laryngeal, Local or General .....
How long has patient had the disease? .....
Any exposure to another case? .....
Have there been any other cases in the same family? .....
Have there been any other cases in the same house? .....
How recently? .....
Would you deem it desirable that a member of the District Nursing Association call upon this patient to give advice or render assistance? .....
If an infant is it fed on cow's milk? .....
If so, is the name of the milk dealer known? .....

Reported by

.....M. D.

Upon receipt of this report additional blanks and stamped addressed envelopes will be forwarded for report of any new cases

The report blanks are kept on file in the State House, a transcript being forwarded to the local health officer, as indicated above. When the physician's report specifically calls for the services of a public health nurse the State Board notifies the district nursing association of the town. The form of the question on the report blank, however, puts the responsibility of a definite appeal for nursing aid upon the physician; and unless he makes such an appeal no supervision is attempted.

In addition to the keeping of the tuberculosis register and the provision of laboratory facilities, the State Board of Health distributes an excellent circular, "Advice to Patients having Tuberculosis of the Lungs" and provides sputum cups and paper napkins free of charge. This is the sum and substance of the part played by the State Board of Health in the campaign against the most prevalent and most deadly, of all preventable diseases.

Dr. Richards and Dr. Round, in the Bulletin of the State Board for February, 1919, called special attention to the danger of the dissemination of tuberculosis by raw milk and urged the enactment of legislation providing for the supervision of the production, transportation and sale of milk. Dr. Round states that five out of seven samples of "Baby's milk" collected in Providence contained tubercle bacilli and adds, "What are we doing about it? Nothing!" Not more than 60 per cent of the milk supply of Providence is at present rendered safe by pasteurization.

Municipal health authorities appear to be even less interested in the problems of tuberculosis. Outside of Providence our canvass of the situation has revealed no special health department activities

along this line; and even in Providence the official machinery for dealing with tuberculosis is extremely tenuous. A vigorous and well planned anti-tuberculosis program was initiated by the Providence Health Department in 1905, but when the new state reporting law went into force in 1909 this program was permitted to lapse. Even the municipal laboratory diagnosis was finally discontinued, as a result of misguided parsimony on the part of the civic authorities. Lately, however, the more coöperative attitude of the State Board of Health has made possible the very desirable resumption of local activities. Two years ago a nurse was employed by the city health department to prepare a card index of known cases of tuberculosis in Providence, based on the reports transmitted by the State Board of Health, and on data obtained from the District Nursing Association and other agencies. Thus there is available an up-to-date local register of tuberculosis which has grown from 1027 frank cases and 173 suspicious cases in August, 1919, to 1170 frank cases and 325 suspicious cases in August, 1920. Of the 1170 frank cases, 1037, were of pulmonary tuberculosis and 133 of other forms. The laboratory diagnosis of local cases of tuberculosis was also resumed in February, 1920 (after the closing of the city laboratory for a year); and during the ten months, December, 1919, through September, 1920, 322 specimens were examined in the city laboratory.

No follow-up work of reported cases is attempted, however, although a visit is made following each reported death from tuberculosis.

Both the State Board of Health and the City Department of Health, therefore, practically limit their activities in regard to tuberculosis to the provision of laboratory diagnosis and the keeping of a register of known cases of the disease. Such a condition is by no means unusual; for curiously enough the task of combating tuberculosis has very commonly been left to the initiative of private organizations. Such organizations have striven earnestly and effectively, in Rhode Island as elsewhere, to meet the responsibilities which have been placed upon them; and they will always have an important function to perform in supplementing the work of public agencies. A complete program of tuberculosis control must, however, center about the inspiring leadership of the constituted health authorities; and it is more than time that legislatures and municipal councils should be awakened to their responsibility in regard to this grave health problem.

For the effective control of tuberculosis in Rhode Island I believe it to be, first of all, essential that the State Board of Health should promulgate new and specific regulations in regard to the control of this disease which shall ensure the adequate supervision of each reported case, a supervision which at present is practically non-existent. The proper policy is, I believe, embodied in the tuberculosis law of New York State. This law requires the reporting of every case of tuberculosis within twenty-four hours. It makes it obligatory upon the local health officer to call this provision to the attention of any physician signing a death certificate for tuberculosis who has not previously reported the disease, and in case of repeated violations the health officer *shall* report such violations to the local health authorities who shall cause such steps to be taken as may be necessary to enforce the penalty for such violation. Whenever a case of tuberuclosis is reported, the local health officer must transmit to the physician "a printed statement and report in a form approved by the state commissioner of health, naming such procedure and precautions as in the opinion of said commisisoner are necessary or desirable to be taken on the premises of a tuberculosis patient." Upon receipt of this statement the physician must sign and date the report, agree to carry out such precautions or if unwilling to do so he must so state upon the report, whenthe duties prescribed devolve upon the local health officer. The health officer has the authority to cause all reported cases of tuberculosis in his jurisdiction to be visited from time to time by a public health nurse. Whenever a complaint shall be made by a physician to a health officer that a patient suffering from tuberculosis is unable or unwilling to conduct himself and to live in such a manner as not to expose members of his family or household or other persons to infection, the health officer should investigate the circumstances and, if he finds ground for so doing, he shall lodge a complaint with the magistrate upon which the offending patient can be brought before the magistrate and committed to a county hospital for tuberculosis or to any state hospital or institution which cares for this disease.

The same principles are embodied in the Sanitary Code of the State of Connecticut, Regulations 35 and 36 of which read as follows:

Regulation 35. Method of control of tuberculosis.

"When a licensed physician or hospital superintendent reports a case of tuberculosis and agrees to assume the responsibility for the proper instruction of the patient and the taking of measures neces-

sary for the protection of others, the health officer need not take action other than prescribed by Chapter 79, Public Acts, 1909.

"Every physician thus assuming the control of a case of tuberculosis shall report to the local health officer on or before the first day of each month, stating whether or not such case is still under his care, and if such report is not made, the health officer shall investigate and take such measures as he deems necessary for the protection of public health.

"When a physician or hospital superintendent declines to assume such responsibility, it shall be the duty of the health officer to supply the afflicted person with printed instructions and take such other action as may be necessary and proper for the protection of public health."

Regulation 36. Control of refractory persons affected with tuberculosis.

"When it comes to the attention of a health officer that a person is affected with tuberculosis and is a menace to the public health or is liable to jeopardize the health of any person or persons in or on the premises occupied or frequented by the affected person, he shall immediately investigate and take proper measures to prevent the spread of such disease for the protection of public health, and if necessary may cause the removal of such person to an isolation hospital or other proper place, there to be received and kept until he shall no longer be a menace to the public health."

It would seem that under Section 13 of Chapter 110 of the General Laws the State Board of Health of Rhode Island has ample powers to formulate regulations along essentially similar lines to those laid down in the New York and Connecticut law.

Outside of Providence it might be necessary to make special provision for the care of the few refractory cases which require forcible detention. In Providence the City Hospital could be used for this purpose.

Ordinances requiring the pasteurization of all milk not of certified grade are eminently desirable; but such ordinances are preferably issued by local authorities. I would recommend that an earnest effort be made to secure such ordinances in Providence, Pawtucket, Woonsocket, and other large communities. Newport already has an ordinance of this kind.

Even more important than legislation, is the provision of a proper expert personnel for dealing with the broader tuberculosis prob-

lems of the state. The whole campaign, at least in that part of the state outside of the city of Providence, should be planned and directed by a single competent leader who can, month by month, watch its progress, fill in gaps as they are manifest and recommend to the State Board of Health such steps as may be necessary for obtaining from time to time a more effective control of this disease. Such a leader should be a physician trained in the diagnosis of tuberculosis, for this branch of medicine is a complex and difficult specialty, almost unrepresented in Rhode Island outside of the city of Providence except by the staff of the State Hospital at Wallum Lake. He should also, if possible, have had training and experience in public health work. A Director of a Division of Tuberculosis under the State Board of Health, if properly qualified, could not only plan the general anti-tuberculosis campaign for the state as a whole but could also supervise existing clinics, organize and, where necessary, serve new clinics, furnish itinerant clinic service for the rural districts and act as a consultant to assist private physicians in the diagnosis of respiratory disorders. The appointment of such a Director is perhaps the most important single step to be taken in the development of anti-tuberculosis work in Rhode Island.

It might be well, as suggested above, for such a State Director of Tuberculosis work to devote his energies chiefly to the portion of the state outside the city of Providence. Providence is a community of sufficient size to occupy the full service of a specialist of this type. Clinic facilities and nursing service are more fully developed in Providence than elsewhere but they are imperfectly coordinated and experience has shown that no agency short of that which represents the community as a whole can hope to effect harmony between conflicting interests. The City Department of Health should, therefore, also be provided with a Division of Tuberculosis under a competent medical specialist, whose duty should be to see that all cases of tuberculosis on the register are so cared for as not to be a menace to others and that each case has every possible opportunity to receive the medical and nursing care or sanatorium treatment necessary for his own welfare. His powers should of course be exercised only where no private physician has undertaken or will undertake to assume the responsibility for the conduct of the case.

Si Arthur Newsholme has well said that when "the medical officer of health or the tuberculosis officer takes little, if any, useful

action after notifications have been received, the practitioner has an excuse for not notifying subsequent cases. He can argue with some cogency that notification has no value *per se;* its utility depends on the action which follows on notification. Unless useful action follows on notification, default in notification has little practical importance."

The principles which should underly the official control of tuberculosis may be stated very simply, although the application is by no means easy of realization. Every case of tuberculosis, for which a physician does not assume direct responsibility, should be followed up to see (a) that the exposure of other persons to infection is minimized, and (b) that the individual affected is brought in contact with facilities for medical, nursing and hospital treatment and given the fullest opportunity to avail himself of the curative possibilities which they offer. In order that machinery may be built up for these ends it is essential that an official director of anti-tuberculosis work in the city of Providence and another to serve the remainder of the state should be appointed under the auspices, respectively, of the city and state departments of health.

IV. CLINIC SERVICE FOR THE DIAGNOSIS AND TREATMENT OF TUBERCULOSIS IN RHODE ISLAND.

The tuberculosis clinic serves a double purpose as an instrument, on the one hand for the early diagnosis of the disease, and on the other for the systematic treatment of such known cases as may properly be cared for outside the sanatorium. In view of its importance as a diagnostic agent the clinic deserves first place in a review of available machinery for the control of tuberculosis.

In the city of Providence there are at present eight different tuberculosis clinics each week, four at the Rhode Island Hospital (one for children), two (one opened very recently) at the City Hospital and one each at Lyra Brown Nickerson House and at Federal Hill, House (both the latter being under the direction of the medical staff of the City Hospital). Outside of Providence five clinics are held each week, two in Pawtucket, and one each in Woonsocket, Riverpoint and East Providence.

The four clinics directed by the Rhode Island Hospital are operated under particularly advantageous circumstances. The Dis-

pensary Building at the City Hospital plant itself and the two settlement houses (Lyra Brown Nickerson and Federal Hill), where these clinics meet, are convenient and attractive. Furthermore Dr. D. L. Richardson, superintendent of the City Hospital, is keenly interested in the development of his tuberculosis clinics and purposes in the future to have a member of his full-time staff in attendance at each clinic to ensure continuity and harmony of service. This is the greatest need in clinic service at the present time, in Rhode Island, as everywhere else. It is hard to say too much in praise of the busy physicians who in the past have given so generously of their time and energy in clinic service; but it is unfair to demand, and unreasonable to expect, that unpaid assistance can ever fulfill the highest ideals of clinic service. The nursing organization of the Providence clinics on the other hand is admirable, all of them being served by the tuberculosis nurses of the District Nursing Association. Adequate clerical service is supplied by the hospitals and settlement houses where the clinics are held.

The volume of work accomplished by these clinics is indicated in Table X below. It is apparent that the City Hospital clinics are all growing rapidly, while the Rhode Island Hospital clinics suffered a material decline in numbers during the first half of the present year.

TABLE X.

Volume of Work Done by Providence Clinics.

Period	Clinics	Number of clinics held	Number of visits by patients. Old patients	New patients	Total
1918	R. I. Hospital (3 clinics for adults)	141	915	341	1256
	" children's clinic	34	148	73	221
	City Hospital	50	237	120	357
	Nickerson House	39	119	48	167
	Total for year	264	1419	582	2001
1919	R. I. Hospital (3 clinics for adults)	151	1025	365	1390
	" children's clinic	40	50	23	73
	City Hospital	50	441	197	638
	Nickerson House	48	176	94	270
	Federal Hill House	16	88	50	138
	Total for year	305	1780	729	2509

	R. I. Hospital (3 clinics for adults)	75	327	123	450
Jan. to June, 1920	" children's clinic	22	91	31	122
	City Hospital	25	309	105	414
	Nickerson House	24	135	62	197
	Federal Hill House	23	131	60	191
	Total for six months	169	993	381	1374

Outside of Providence, there are three well-established clinics, at Pawtucket, Woonsocket and Riverpoint, and a new one just opened at East Providence which received twenty-two visits from eighteen patients during the month of September. Tuberculosis cases may be cared for in an emergency at the Newport Hospital but there is no regularly organized clinic.

The Pawtucket clinics are held twice a week at the Memorial Hospital in that city and they serve Central Falls as well as Pawtucket. During the four months previous to my visit (April–July, 1920), thirty-two clinics had been held and eighty-nine new patients and seventy old patients had received treatment.

The clinic at Riverpoint is held every Saturday afternoon and serves the Pawtuxet Valley district in the towns of Coventry and West Warwick. It meets in a commodious and attractive Health Center building, and is fortunate in the keen interest of prominent local physicians, and in the service of an unusually able and devoted nurse. During the twelve months from September, 1919, to August, 1920, fifty-three clinics were held, with fifty-three new patients and one hundred and eighty-seven old patients.

The clinic at Woonsocket has operated under considerable difficulties. It is maintained chiefly by the earnest efforts of the district nursing association. The local medical society appoints six different physicians during the year to serve for two months apiece, an arrangement which does not make either for continuity of policy or skilled specialist service. The clinic is held once a week and during the eleven months, October, 1919, to August, 1920, seventy new patients and seventy-three old patients received treatment.

Some conception of the quantitative adequacy of clinic service may be gained from Table XI.

TABLE XI.

Amount of Clinic Service in Various Areas.

Clinic	Visits per month			Visits per month per 100,000 population	
	Total	New Patients	Population	Total	New Patients
Providence					
Rhode Island Hospital (adults) 75					
" " " (Children) 20	226	63	237,595	91	26
City Hospital 66					
Federal Hill 32					
Lyra Brown Nickerson 33					
Pawtucket and Central Falls 40		22	88,422	45	25
Woonsocket 13		6	43,496	30	14
Pawtuxet Valley (Coventry and West Warwick) 20		4	21,131	95	19
East Providence 22		18	21,793	101	83

It is evident that from the standpoint of new patients per unit of population both Providence and Pawtucket are fairly well served. (The figures for East Providence are of course abnormal since they refer to the first month of operation of this clinic.) The ratio of new patients admitted to all tuberculosis clinics in New York City for the twelve months, October, 1919 to September, 1920, was 29 per month per 100,000 population. On the basis of total visits per month per 100,000 population, however, both Pawtucket and Woonsocket show up very badly. Even in Providence and at Riverpoint the ratios of 91 and 95 visits per month per 100,000 population, while it compares favorably with the ratio existing in many communities (the corresponding figure for New Haven is 97), falls far short of the standard set in New York City where the admirable system of clinic statistics shows an average of 173 visits per month per 100,000 population for the twelve months, October, 1919 to September, 1920. Evidently the existing Rhode Island clinics are getting the patients, but are failing to hold them; and nearly a third of the state population, outside the cities listed in the table, is entirely without local tuberculosis clinic facilities.

The measurement of the quality, as distinguished from the quantity, of clinic work is an exceedingly difficult task. In New York the Association of Tuberculosis clinics requires all its members to prepare a monthly report which includes a classification of dis-

charged cases according to duration of treatment, reason for discharge and condition at time of discharge. No such data are prepared by the Providence clinics. The ratio of new to old cases treated gives us a rough measure, however, of the efficiency with which the clinic holds its patients.

Variations in the type of patients treated will of course affect this ratio and it is evident that even a single visit may be wholly adequate if it leads to prompt admission to a sanatorium. On the whole, however, in a large clinic this ratio varies pretty closely with efficiency of service and furnishes one of the objective criteria, so much to be desired in measuring the quality of public health agencies. In New Haven, for example, the clinic at the New Haven Dispensary shows a ratio of 3.3 visits per new patient while the City Clinic, which has been more or less disorganized by unavoidable changes in medical personnel, shows a ratio of 1.7 visits per new patient. The well organized clinics of New York City show a ratio for the past twelve months of 6.0 visits for each new patient admitted. On the basis of this ratio, it appears from Table XII that

TABLE XII.

Frequency of Attendance on the Part of the Individual Patient.

Clinic	Ratio of Total Visits to New Patients*
Providence	
Rhode Island Hospital (adults)	3.7
" " " (children)	3.9
City Hospital	3.9
Federal Hill	3.2
Lyra Brown Nickerson	3.2
Pawtucket and Central Falls	1.8
Woonsocket	2.0
Pawtuxet Valley	4.5

the Riverpoint (Pawtuxet Valley) clinic is attaining good results, the City Hospital and Rhode Island clinics are doing fairly well, the Federal Hill and Lyra Brown Nickerson clinics less well and the Pawtucket and Woonsocket clinics very poorly. It is probable that the failure to hold patients in the last two instances is chiefly due to the lack of continuous medical service by specialists; but the nursing service in these two cities is also perhaps not up to the

*Note that this ratio is higher than the ratio of visits per patient in Table XIII, since it is computed from the *total* visits and the *new* patients.

standard set in Providence and at Riverpoint. Conditions at the Pawtucket clinic are being materially improved through the active interest of Dr. James Wheaton.

In order to gain a somewhat clearer conception of the actual nature of the clinic work Mr. Chandler analyzed the individual records of 209 patients from the Rhode Island clinic and of 172 patients from the City Hospital clinic, the cases being taken at random, among those admitted prior to July 1, 1919, so that all should have been under care for at least one year. The results are presented in Table XIII. Aside from the fact that a larger proportion of cases are recorded as definitely non-tuberculous at the City Hospital the results at the two clinics are fairly comparable. The Rhode Island Hospital clinic is somewhat more successful in securing institutional treatment, although both records in this respect are very good. Excluding cases found to be non-tuberculous, the Rhode Island Hospital placed 36 per cent of its cases in hospitals or sanatoria, the City Hospital, 30 per cent. Exactly the same proportion of cases in each instance was kept under observation with deferred diagnosis and 11 per cent of the cases were kept under observation with a definite diagnosis at the Rhode Island against 18 per cent at the City Hospital (percentage computed after excluding cases definitely pronounced non-tuberculous). The small proportion of cases reported as lost is, in both cases, most gratifying.

TABLE XIII.

Analysis of a Random Series of Clinic Cases.

Classification	Rhode Island Hospital			City Hospital		
	No.	Per Cent	Visits per patient	No.	Per Cent	Visits per patient
Found non-tuberculous	52	25	2.3	80	46	2.1
Admitted to sanatorium or hospital	57	27	2.8	28	16	2.8
Kept under observation. Tuberculous.	17	8	3.1	17	10	3.4
Kept under observation. Diagnosis deferred.	56	27	2.3	29	16	2.5
Moved from city	9	4	3.9	3	2	2.3
Lost	8	4	1.0	4	2	1.5
Dead	10	5	1.3	9	5	3.4
Discharged to physicians				2	1	2.5
Total	209	100	2.5	172		2.5

It will be noted that the number of visits to the clinic per patient is over three for the cases definitely diagnosed as tuberculous and kept under observation at home, just under three for the group finally placed in institutions, 2.3 to 2.5 for the group kept under observation with deferred diagnosis and 2.1 to 2.3 for the patients definitely pronounced non-tuberculous.

The results of this analysis indicate that our comparison of the ratio of clinic visits to new patients in New York and in Rhode Island is not seriously vitiated by differences between the type of patients handled. The proportion of cases found non-tuberculous was 25 per cent at the Rhode Island and 46 per cent at the City Hospital, against 40 per cent for the New York clinics, in 1919. If anything the Rhode Island Hospital clinic should require a higher average of visits per case. The disadvantages under which the Rhode Island Hospital clinic would appear to labor on the face of these figures is however in great measure counterbalanced by the very large group of cases with deferred diagnosis (27 per cent).

There is a real difference, on the other hand, between the Providence and New York clinics in regard to the utilization of sanatorium treatment. The Rhode Island clinic shows 27 per cent of its cases admitted to a sanatorium or discharged to other medical care, and the City Hospital, 17 per cent; while the corresponding figure for the New York City clinics in 1919 was only 9 per cent. This contrast may help to account for the lower ratio of visits in Providence; but its influence cannot obviously be important, since Table XIII shows that the visits per patient in the Providence clinics were actually higher in the case of the cases admitted to sanatoria than for the general average of all patients treated.

Somewhat in contrast to the Providence figures are the data obtained from a study of 70 consecutive cases admitted to the Woonsocket clinic which showed 23 cases (33 per cent) pronounced non-tuberculous and only 8 (11 per cent) admitted to hospitals or sanatoria. The average visits per patient in this series was only 1.7.

The conclusions which may be drawn from a review of the tuberculosis clinic situation in Rhode Island may be summarized as follows:

In Providence the clinics are fairly adequate in the amount of service rendered and are on the whole operating with success. Through the efforts of the District Nursing Association it is possible to keep in some sort of contact with 90 per cent of all patients who

once visit a clinic and the fact that, of all patients not definitely pronounced non-tuberculous one-third are actually admitted to hospitals or sanatoria is most gratifying, although the ratio of visits per patient is as usual regrettably low. An obvious deficiency is to be found in the inadequacy of the system of records in use. The records kept by the nurses are excellent so far as they go, but it is most important, in order that the efficiency of the clinics may be properly appraised, to institute a system of medical records which shall show clearly, at monthly intervals, how many patients have been admitted and at what stage of the disease process, how many have been discharged, for what reasons, and in what condition, how many patients remain under care and to what grades of disease they belong; and which shall make it possible to compute the true ratio of visits per patient and the average length of time for which various classes of patients remain under care.

As a general principle it seems clear that the fullest development of clinic service in the future will demand the payment of the physicians who attend the clinics. The City Hospital is fortunate in having a full-time staff which can be utilized so as to secure adequate medical supervision of its clinic service, and the extension of the plan of paid medical service must be given serious consideration in the future for all clinics of this type.

Finally it must be recognized that there is a certain proportion of dispensary cases of tuberculosis in which domiciliary visits by a physician are essential to adequate control of the disease. Such domiciliary visits should not be made on an eleemosynary basis but as a part of the duty which the community owes to its citizens in the protection of the public health. The working out of detailed plans for the attainment of these three desiderata, the standardization and extension of clinic records, the reorganization of clinic medical service on a proper financial basis, and the provision of occasional medical service for domiciliary cases is beyond the scope of the present survey. They should form the first duties of the Director of Tuberculosis, whose appointment as an officer of the municipal health department has been recommended above.

Outside the city of Providence, conditions in regard to clinic facilities are far less satisfactory. The Pawtuxet Valley is admirably served by the Riverpoint clinic. The Pawtucket and Woonsocket clinics on the other hand are by no means on a satisfactory basis. The attendance per 100,000 population has been low and the ratio

of two visits or less per new patient indicates a waste of resources and a failure to serve effectively even the small clientele which is reached. Outside of the cities of Providence, Pawtucket, and Woonsocket and the towns of West Warwick and Coventry there is no regular clinic service at all. The entire southern half of the state, the northwestern quarter of the state and the Newport region are without clinical facilities, including nearly one third of the population of Rhode Island.

The first duty of the Director of Tuberculosis of the State Board of Health should be to stimulate the development of the Pawtucket and Woonsocket clinics on the most effective basis, to secure the establishment of new clinics in Newport and perhaps in Cranston, Warwick and Bristol, and to provide in some way for occasional clinic service in the smaller rural communities. The latter object might be attained through visits to be made by the Director to rural communities where prospective patients had been located through the activity of visiting or industrial nurses; and in any of the larger centers where specialists equipped to diagnose tuberculosis are not available, the State Director might well arrange to conduct a weekly clinic in person. The well equipped staff of the State Sanatorium at Wallum Lake could well be called upon to assist in this work.

Finally, a word should be said in regard to the importance of developing the general medical service, available for the community at large, to the highest possible level in respect to the problem of tuberculosis. The diagnosis of this disease is a task of exceeding difficulty and for its successful performance requires a detailed knowledge and a special experience which the average general practitioner cannot be expected to possess. The great value of an expert consultation service in the diagnosis of tuberculosis has been amply demonstrated at Framingham and elsewhere; and Dr. Elliott Washburn, Executive Secretary of the Providence Tuberculosis League, has just inaugurated a consultation service of this kind for physicians in the city of Providence. This is a most admirable step and the consultation service, as continued and extended, should prove one of the most valuable instruments in the anti-tuberculosis campaign. A very useful function of the state director of tuberculosis, whose appointment is recommended in this report, would be to offer such a consultation service to physicians of the state outside of the city of Providence.

V. PROVISION FOR HOSPITAL AND SANATORIUM CARE OF TUBERCULOSIS IN RHODE ISLAND.

Provision for the hospital and sanatorium treatment of pulmonary tuberculosis in Rhode Island is made by the following institutions:

A. State Hospital and Sanatorium at Wallum Lake. Total of 363 beds (sanatorium cases, 170 beds, advanced cases, 153 beds, children, 40 beds).

B. Providence City Hospital, 60 beds (for advanced cases).

C. St. Joseph's Hospital Annex, Hillsgrove, 70 beds (for advanced cases).

D. Tuberculosis wards, State Almshouse Hospital, Howard (46 beds).

There are also a certain number of cases of tuberculosis cared for in the State Hospital for Mental Diseases at Howard, 19 in number on July 1, 1920.

In addition to the institutions designed for the care of active cases of pulmonary tuberculosis, there is a Preventorium at Hoxsie, conducted by the Providence Tuberculosis League and a hospital for bone and joint cases (Crawford Allen Branch of the Rhode Island Hospital), at East Greenwich. The Preventorium has winter accommodations for about 40 children and in summer can receive about 50. During the year ending October 1, 1920, 153 children were given 9359 days' care in this institution; while in addition convalescent and summer outing provision was made for 618 women and children (7845 days' care).

The Crawford Allen Branch has 45 beds and is open only in the summer season, the patients returning to their homes or to general hospitals for the winter.

Returning to the institutions designed primarily for the institutional care of active cases of tuberculosis we find provided a total of approximately 540 beds, 170 for early cases, 283 for advanced cases, 46 for either type (at the State Hospital) and 40 for children (at Wallum Lake). The total provision amounts to 1 bed for every 1100 population or 1 bed for every 1.6 annual deaths from tuberculosis. On the theoretical basis which calls for at least 1 bed for every annual death the hospital provisions of the state would seem to be still inadequate. Rhode Island is much better off than most states, however. In New York State (outside of New York City)

the corresponding ratios are 1 bed for 1600 population or 1 bed for every 1.9 deaths from tuberculosis. Furthermore, the hospital beds now provided are by no means fully occupied.* At Hillsgrove the 70 beds have been regularly filled to capacity and at one time 20 additional cots were in use. At the State Almshouse two pavilions containing 46 beds are usually filled. At the Providence City Hospital, however, there have generally been extra beds available and the Wallum Lake wards have of late been only two-thirds filled, as indicated by Table XIV below.

Prior to 1917 the beds at these two institutions were fairly well utilized but during the past three years there has been a falling off in cases at the City Hospital, and no increase at Wallum Lake to correspond with the opening of the new building for advanced cases in 1918.

Empty beds have been common in many sanatoria as a result of the decrease in tuberculosis during the last two years and of the high wages which tempt patients to stay at work when they should

TABLE XIV.

Utilization of Hospital and Sanatorium Facilities.

	Wallum Lake		City Hospital	
Year	Beds available	Beds occupied	Beds available	Beds occupied
1910	130	123	35	29
1911	140	127	35	33
1912	140	134	60	41
1913	140	115	60	52
1914	140	119	60	54
1915	157	146	60	60
1916	208	180	60	61
1917	216	201	60	45
1918	360	222	60	44
1919	360	232	60	55

be in the hospital. Nine New York county hospitals for which I have obtained data show from 5 per cent to 40 per cent of empty beds in 1919, with an average of 23 per cent. Only one of the nine, however, shows as high a ratio as Wallum Lake (36 per cent vacant beds).

In the best sanatoria, treatment is still in as great demand as ever. At the Gaylord Farm Sanatorium in Connecticut 97 per

*The intensive work carried out at Framingham has indicated that an ideal provision would be two beds for each annual death.

cent of the beds were occupied on the average during both 1918 and 1919, in spite of an increased capacity of 14 beds during the latter year. In Dutchess County, New York, the Samuel Bowne Memorial Hospital reports 99 per cent utilization of facilities.

In order to obtain a better idea of the actual degree of hospitalization accomplished from time to time, in the state as a whole, and in its various areas, Mr. Chandler has prepared Tables XV and XVI, which give the admission rate at Wallum Lake and Hillsgrove, respectively, from each city or town in the state for each year from 1910 to 1919. Similar data for the Providence City Hospital are combined with the yearly averages for all admissions at Wallum Lake and Hillsgrove for the various years in Table XVII.

TABLE XV.

Admissions to Wallum Lake from each City or Town and Rate per 1000 Population.

Residence	1910	Per 1000 Population	1911	Per 1000 Population	1912	Per 1000 Population	1913	Per 1000 Population	1914	Per 1000 Population	1915	Per 1000 Population	1916	Per 1000 Population	1917	Per 1000 Population	1918	Per 1000 Population	1919	Per 1000 Population	Average 10 years
Barrington	...	...	3	1.17	1	.38	...	...	...	...	...	...	...	...	...	...	2	.56	2	.53	.26
Bristol	1	.12	2	.22	1	.11	1	.10	1	.10	2	.19	6	.57	6	.56	17	1.54	11	.98	.45
Burrillville	6	.76	6	.76	5	.53	3	.37	6	.74	6	.74	5	.61	4	.48	8	.95	11	1.29	.42
Central Falls	13	.57	21	.92	15	.65	9	.39	15	.64	18	.76	18	.76	13	.54	26	1.08	27	1.12	.74
Charlestown	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Coventry	1	.17	...	...	5	.87	4	.70	7	1.22	...	...	1	.18	...	...	2	.35	2	.35	.38
Cranston	2	.10	11	.49	8	.35	10	.41	10	.39	2	.08	11	.40	6	.21	9	.32	15	.52	.33
Cumberland	4	.39	7	.70	5	.50	2	.20	1	.10	...	...	6	.60	1	.10	...	...	4	.40	.30
East Greenwich	3	.88	...	...	2	.57	1	.28	...	...	...	...	2	.57	1	.29	...	...	...	...	.26
East Providence	5	.32	5	.31	3	.11	7	.40	7	.38	8	.43	7	.36	12	.59	18	.86	22	1.03	.48
Exeter	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	.98	.10
Foster	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Glocester	...	...	...	...	...	...	...	...	1	.68	1	.67	...	...	2	1.38	2	1.40	...	...	.41
Hopkinton	...	...	...	...	1	.41	...	...	...	...	...	...	...	...	...	...	...	...	1	.43	.08
Jamestown	...	...	...	...	...	...	...	...	...	...	...	...	1	.06	1	.06	...	...	...	...	.01
Johnston	3	.51	3	.49	1	.16	3	.47	4	.61	6	.90	6	.89	1	.15	6	.88	2	.21	.53
Lincoln	...	...	...	...	2	.20	8	.80	6	.60	9	.89	8	.80	6	.61	13	1.33	13	1.35	.66
Little Compton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1.44	...	...	...	...	.14
Middletown	1	.59	1	.57	1	.55	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.17
Narragansett	1	.80	...	...	...	...	1	.74	...	...	...	...	...	...	...	...	...	...	1	.96	.25
Newport	13	.41	17	.61	21	.74	19	.65	26	.87	23	.75	21	.69	19	.63	25	.82	18	.59	.68
New Shoreham	...	...	...	...	...	...	...	...	...	...	...	...	1	.75	2	1.60	...	...	...	...	.24
North Kingstown	...	...	...	...	...	...	...	...	5	.77	...	...	1	.26	...	...	3	.84	1	.29	.22
North Providence	1	.18	1	.18	6	1.01	...	...	...	...	5	.77	3	.43	3	.42	2	.27	7	.93	.42
North Smithfield	1	.37	...	...	1	.36	1	.36	...	...	6	2.14	5	1.73	2	.67	...	...	3	.96	.66
Pawtucket	36	.70	32	.61	35	.66	23	.43	30	.55	24	.43	38	.66	42	.71	53	.87	47	.74	.64
Portsmouth	...	...	...	...	...	...	1	.37	...	...	2	.74	...	...	...	...	...	...	2	.77	.19
Providence	148	.61	154	.67	135	.58	139	.58	146	.60	159	.64	195	.80	229	.94	285	1.18	248	1.04	.76
Richmond	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Scituate	...	...	...	...	...	...	1	.29	...	...	...	...	...	...	2	.62	1	.32	...	...	.12
Smithfield	1	.37	2	.70	...	...	3	.98	3	.95	3	.91	1	.31	4	1.23	1	.31	3	.93	.67
South Kingstown	6	1.16	1	.19	1	.19	1	.19	2	.37	3	.55	1	.18	2	.37	8	1.51	2	.38	.51
Tiverton	...	...	...	...	2	.48	...	...	...	...	2	.45	3	.70	...	...	3	.74	1	.25	.26
Warren	2	.30	1	.15	...	...	2	.29	2	.28	3	.41	4	.54	1	.13	3	.39	6	.77	.33
Warwick	14	.53	12	.44	12	.43	1	.08	1	.08	3	.23	8	.60	4	.30	13	.97	12	.90	.45
West Warwick	...	...	...	...	...	...	4	.26	10	.64	9	.57	11	.70	8	.51	14	.91	13	.84	
Westerly	3	.34	2	.22	2	.22	1	.10	...	...	4	.39	1	.10	3	.30	7	.70	4	.40	.28
West Greenwich	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Woonsocket	26	.68	26	.68	34	.87	27	.69	26	.66	42	1.05	45	1.10	32	.77	43	1.01	70	1.62	.91
Outside State	...	...	...	...	...	...	...	...	5	...	...	...	...	...	1	...	2	...	3	...	...
	291	.54	307	.55	299	.53	272	.47	314	.53	340	.57	409	.68	409	.68	566	.94	552	.91	.64

TABLE XVI.

Admissions to Hillsgrove from each City or Town with Rates Per 1000 Population.

Residence	1910	Per 1000 population	1911	Per 1000 population	1912	Per 1000 population	1913	Per 1000 population	1914	Per 1000 population	1915	Per 1000 population	1916	Per 1000 population	1917	Per 1000 population	1918	Per 1000 population	1919	Per 1000 population	Average 10 years
Barrington	...	...	1	.39	1	.38	1	.36	...	...	...	...	...	...	...	...	...	...	...	...	.11
Bristol	4	.47	...	...	1	.11	1	.10	3	.30	5	.49	4	.38	6	.56	1	.09	1	.09	.26
Burrillville	...	...	1	.3	2	.25	...	...	1	.12	...	...	1	.12	1	.12	...	...	...	...	.07
Central Falls	2	.09	6	.26	6	.26	2	.09	13	.55	8	.34	10	.42	12	.50	10	.42	5	.21	.31
Charlestown	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Coventry	...	...	...	...	1	.17	...	...	1	.18	...	...	...	...	2	.35	...	...	...	...	.07
Cranston	...	...	2	.09	...	...	1	.04	8	.31	3	.11	4	.15	4	.14	4	.14	4	.14	.11
Cumberland	...	...	...	...	...	...	...	...	...	...	...	...	2	.20	...	...	...	...	...	...	.02
East Greenwich	...	...	3	.87	...	...	1	.28	2	.56	1	.28	...	...	3	.87	1	.29	...	...	.32
East Providence	...	...	6	.37	7	.42	7	.40	3	.16	3	.16	...	...	2	.10	6	.29	3	.14	.20
Exeter	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Foster	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Glocester	...	...	...	...	...	...	...	...	...	...	1	.67	...	...	...	...	...	...	...	...	.07
Hopkinton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jamestown	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Johnston	...	...	...	...	...	...	...	...	4	.61	3	.45	1	.15	1	.15	...	...	...	...	.14
Lincoln	1	.10	3	.30	1	.10	1	.10	2	.20	4	.39	5	.50	6	.61	1	.10	2	.21	.26
Little Compton	1	.78	...	...	...	...	...	...	1	.73	...	...	...	...	...	...	...	...	...	...	.15
Middletown	...	...	...	...	...	...	...	...	...	...	...	...	1	.50	...	...	...	...	...	...	.05
Narragansett	...	...	...	...	...	...	...	...	...	...	...	...	1	.75	...	...	...	...	...	...	.08
Newport	1	.04	...	...	...	...	4	.14	...	...	3	.10	...	...	3	.10	4	.13	2	.07	.06
New Shoreham	...	...	...	...	...	...	1	.07	...	...	...	...	...	...	2	.16	...	...	...	...	.02
North Kingstown	...	...	...	...	...	...	1	.25	...	...	...	...	...	...	...	...	...	...	...	...	.03
No th Providence	...	...	...	...	1	.17	1	.16	1	.15	...	...	3	.43	...	...	1	.14	1	.13	.12
North Smithfield	...	...	...	...	...	...	1	.36	...	...	...	...	...	...	...	...	...	...	...	...	.04
Pawtucket	5	.10	8	.15	9	.17	19	.35	23	.42	16	.29	18	.31	22	.37	13	.21	5	.08	.25
Portsmouth	...	...	...	...	...	...	2	.75	...	...	1	.37	...	...	...	...	...	...	...	...	.11
Providence	80	.36	77	.34	98	.42	95	.40	94	.38	79	.32	63	.26	52	.21	32	.13	51	.21	.30
Richmond	...	...	...	...	...	...	1	.66	...	...	...	...	...	...	1	.72	...	...	...	...	.14
Scituate	...	...	1	.29	1	.29	1	.29	1	.30	...	...	...	...	...	...	...	...	...	...	.12
Smithfield	...	...	...	...	...	...	1	.33	...	...	1	.30	...	...	...	...	...	...	1	.31	.09
South Kingstown	...	...	1	.19	...	...	...	...	...	...	...	...	3	.55	1	.19	...	...	...	...	.09
Tiverton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Warren	1	.15	3	.45	1	.15	2	.29	2	.28	2	.28	2	.27	2	.26	2	.26	...	...	.24
Warwick	1	.08	3	.24	6	.48	6	.47	6	.46	6	.45	7	.53	6	.45	1	.07	7	.52	.38
West Warwick	1	.07	2	.13	4	.26	...	...	7	.45	2	.13	3	.19	1	.06	1	.06	3	.19	.15
Westerly	...	...	3	.33	...	...	1	.10	5	.51	1	.10	...	...	...	...	...	...	...	...	.10
West Greenwich	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Woonsocket	5	.13	8	.21	7	.18	4	.10	9	.23	10	.25	14	.34	8	.19	12	.28	3	.07	.20
Outside State	3	...	3	...	7	...	8	...	12	...	8	...	8	...	10	...	9	...	7	...	...
	105	.19	131	.24	153	.27	162	.28	198	.34	157	.26	150	.25	145	.24	98	.16	95	.16	.24

TABLE XVII.

Admission Rate to Tuberculosis Hospitals and Sanatoria.

Admissions per 100,000 Population.

Year	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	Ten Years
Rate	92	97	100	102	117	115	125	137	153	133	117

The admission rates show a practically steady increase from 1910 to 1918, with a large increment in 1918, when the new pavilion at Wallum Lake was opened. In 1919 there was a falling off, coincident with the decreased incidence of tuberculosis indicated by the mortality rates previously cited. This decrease in the incidence of tuberculosis characteristic of the year 1919 (and apparently continuing in 1920) is presumably due to the combined influences of prosperity, prohibition and military training. It would naturally lead to a decrease in sanatorium treatment, other things being equal, but since we know that in the best of times a very large number of cases of tuberculosis which would benefit by institutional care fail to receive it, the present situation should merely serve as an opportunity for developing the use of hospital and sanatorium facilities by classes of cases which have failed to avail themselves of such advantages in the past.

The general situation with regard to the hospitalization of tuberculosis in Rhode Island is, however, extraordinarily good as compared with other states. Connecticut in 1918 had a total tuberculosis admission rate of only 78 per 100,000 population; and 18 counties of New York State for which we obtained the 1919 records had an average admission rate of only 109 per 100,000 population. The Rhode Island figures give 91 admissions per 100 annual deaths, the New York figures 80 and the Connecticut figures only 53, a splendid showing for Rhode Island.

Turning to the variations in degrees of hospitalization apparent in different areas within the state we have prepared in Table XVIII comparative figures for the larger cities and for the rest of the state. In all these tabulations the cases cared for at the state institution of Cranston are omitted, but the totals would be too small to affect our ratios in material degree.

It appears from Table XVIII that hospitalization of tuberculosis cases, in proportion to the incidence of the disease (ratio of annual admissions per 100 annual deaths), is most complete in Providence, with Woonsocket, Central Falls, Pawtucket and Newport follow-

ing in the order named, while Cranston and the rural districts lag notably behind. This is exactly what would be expected from the fact that clinic and nursing services are most highly developed in Providence and are almost lacking in Cranston and in the other rural districts.

In general we may conclude, in regard to the quantitative adequacy of institutional facilities, that while the number of hospital and sanatorium beds provided is not sufficient for the care of all the patients who ought ideally to receive institutional treatment, there are today more beds available than are being utilized. The immediate problem is therefore the development of machinery which will get more patients into the hospitals and sanatoria, an end which can best be attained by the improvements in clinic service which have been suggested above; for the clinic if properly organized should be the primary feeder of the sanatorium.

TABLE XVIII.

Admission Rate to Tuberculosis Hospitals and Sanatoria.

Average 1910–1919

City	Providence	Pawtucket	Woonsocket	Newport	Cranston	Central Falls	Rest of State
Admission rate per 100,000 population	135	89	111	74	44	105	69
Admission rate per 100 annual deaths	69	56	64	56	46	64	50

The main service which the hospital for advanced cases of tuberculosis renders is the removal of dangerous open cases from the proximity of other persons, and particularly of children, who might be endangered by their presence in the community at large. The object of sanatorium treatment on the other hand is the restoration of the health of the patient; and the attainment of this end depends on the beginning of treatment at a sufficiently early stage in the treatment of the disease. The next point in which we are interested is, therefore, the condition of the patients admitted, particularly at Wallum Lake, since the Providence City Hospital and the St. Joseph's Annex are primarily designed for the hospitalization of advanced cases.

The admirable statistics of the State Sanatorium at Wallum Lake give the following classification of cases admitted, in percentages of total admissions for each year:

	1915	1916	1917
Incipient cases	7	4	1
Moderately advanced cases	80	82	83
Far advanced cases	13	13	15

The average duration of disease before admission was estimated at 21.8 months and 24.5 months for the years 1916 and 1917, respectively.

For the past two years the patients have been classified according to the newer terminology as follows:

Condition on Admission		1918	1919
I	A	38	33
	B	34	45
	C	4	3
II	A	42	35
	B	211	190
	C	32	24
III	A	5	4
	B	61	72
	C	110	91
Other		29	55

The data for 1915, 1916 and 1917 are most important for our purposes, since they include only sanatorium cases, the new ward for advanced cases having been opened in 1918. They are distinctly discouraging from the standpoint of curability of the patients admitted, since only from 1 to 7 per cent of the cases fall in the incipient class. Statistics from many institutions show that of incipient cases 75 per cent or over may be expected to show improvement under proper sanatorium treatment, while with moderately advanced cases the proportion falls to 50 to 60 per cent, and with far advanced cases to 40 per cent or less. It is unfortunately true that tuberculosis cases reach all our sanatoria at a deplorably late stage, but conditions are not usually as bad as in Rhode Island. At the Gaylord Farm Sanatorium in Connecticut the figures for 1917, 1918 and 1919 show, respectively, 19 per cent, 14 per cent and 11 per cent of the cases admitted to be incipient, 67 per cent, 69 per cent and 74 per cent moderately advanced and 14 per cent, 17 per cent and 14 per cent, respectively, to be far advanced. Even the four state sanatoria of Connecticut, which admit all types of cases, report for 1918, 7 per cent of incipient cases, although the proportion of far advanced cases (52 per cent) is also much higher than at Wallum Lake.

At the Providence City Hospital conditions are naturally even less encouraging than at Wallum Lake. For the three years 1917 to 1919 between 1 per cent and 3 per cent of the patients admitted have been incipient cases, between 10 per cent and 22 per cent moderately advanced cases and between 77 per cent and 87 per cent far advanced cases. This is naturally to be expected, since the City Hospital tuberculosis pavilion is primarily intended for isolation rather than for curative treatment.

The next criterion which may properly be applied in estimating the efficiency of sanatorium and hospital treatment is the length of stay in the institution; for it may be assumed under present conditions of sanatorium management that an average of six months' residence will be necessary in order to effect a reasonable proportion of successful treatments.

At the Providence City Hospital and at Hillsgrove the average period of residence is of course short, since the cases received are mostly in an advanced stage; and at Wallum Lake the opening of the ward for advanced cases in 1918 was followed by a sharp fall in the average for the institution as a whole. Incidentally it may be remarked that it would be helpful to keep and tabulate separately the statistics for the sanatorium and hospital wards at Wallum Lake, since the aims of the two types of treatment and the criteria by which they may be judged are so distinct, although Dr. Barnes feels that certain practical considerations make such a sharp separation undesirable. If we exclude 1918 and 1919 from consideration, however, the average period of residence for the years 1910–1917 at Wallum Lake is still only 156 days.

This period of residence is too short to permit of the maximum benefit from sanatorium treatment; but it is a record no worse than is reported from many institutions of similar type. Recent statistics have shown an average residence of 129 days at Wildwood Sanatorium, 158 days at the New Jersey Sanatorium and 160 days at Hebron, Maine. On the other hand, New Hampshire reports 175 days, Suffolk County, New York, 204 days, Monroe County, New York, 214 days, North Reading, 213 days, Rutland, 269 days. At Gaylord Farm the average stay for all patients was 182 days in 1917, 200 days in 1918 and 194 days in 1919. It is clear that the short period of residence at Wallum Lake is a distinct handicap to the efficiency of the institution; and this conclusion is emphasized by the fact that of the total patients discharged 41 per cent in 1915,

54 per cent in 1916, and 53 per cent in 1917, left against advice. The period of residence at Wallum Lake is also however affected by the fact that patients who are definitely failing are frequently forced to go to Hillsgrove or the Providence City Hospital to make room for more favorable cases. During the years 1908–1912, inclusive, 16 per cent of the discharged patients were forced out in this way.

Considering the fact that so many of the patients at Wallum Lake are admitted too late in the course of the disease and leave too soon for a cure to be effected, the immediate results of the treatment are surprisingly favorable. For simplicity we have arranged the discharged cases at Wallum Lake (and also at the two hospitals for advanced cases) under three main headings: (a) improved (including arrested and apparently cured and quiescent cases), (b) dead, and (c) all other groupings (including a few cases which were non-tuberculous or doubtful in nature). The results expressed in percentages are given in Table XX.

At the Providence City Hospital and at Hillsgrove a little more than half the patients die and less than a quarter show improvement, a result which is about what might be expected from the type of cases admitted. At Wallum Lake the opening of the ward for advanced cases in 1918 naturally led to a marked decrease in the proportion of improved cases. Again the importance of keeping distinct the statistics of sanatorium and hospital cases at Wallum Lake is made apparent. The only fair basis of judgment as regards sanatorium treatment is to consider the statistics for Wallum

TABLE XIX.

Average Length of Stay in Sanatoria and Hospitals.

	Wallum Lake	Hillsgrove	Providence City Hospital
1910	153 days	50 days	36 days
1911	151 "	81 "	82 "
1912	149 "	85 "	131 "
1913	155 "	113 "	109 "
1914	138 "	79 "	94 "
1915	169 "	134 "	117 "
1916	154 "	109 "	99 "
1917	179 "	111 "	92 "
1918	138 "	221 "	90 "
1919	139 "	151 "	71 "
Average	152 "	113 "	92 "

TABLE XX.

Condition of Patients Discharged from Hospitals and Sanatoria.
(Percentages of Total).

	Wallum Lake			Providence City Hospital			Hillsgrove		
Year	Improved	Dead	Others	Improved	Dead	Others	Improved	Dead	Others
1910	74	2	24	25	60	15	50	50	0
1911	70	1	28	25	61	13	23	58	19
1912	73	3	25	28	55	17	16	55	29
1913	65	1	34	23	54	23	14	47	39
1914	61	1	37	21	48	31	9	53	38
1915	62	4	34	27	54	19	15	52	33
1916	63	4	32	21	58	20	16	49	35
1917	61	5	34	25	53	22	14	61	25
1918	46	26	28	18	53	29	22	52	26
1919	42	26	32	19	54	27	32	40	28
Ten years	62	7	31	23	55	22	21	52	27

Lake prior to 1918. The averages for 1910–1917 are as follows: improved, 66 per cent; dead, 3 per cent; all others, 31 per cent.

The heading "improved" as used in Table XX is of course a very vague term and the Wallum Lake cases of this type have been further subdivided in Table XXI. It appears from this tabulation that only 3 per cent of the sanatorium cases treated between 1910 and 1917 were definitely considered as cured and only 17 per cent as apparently arrested, 12 per cent being quiescent and 34 per cent merely improved.

At the Gaylord Farm Sanatorium, the average results for the three years 1917 to 1919 were as follows: cases apparently arrested, 8 per cent; quiescent, 39 per cent; improved, 32 per cent; dead, 2 per cent; all others, 19 per cent.

The success of sanatorium treatment can not, however, be judged solely by the somewhat arbitrary classification of the condition of the patients on discharge. The real test is the fate of the patients when they return to the conditions of community life outside. Dr. Barnes, the superintendent of the State Sanatorium, has conducted most valuable studies of the condition of his patients after discharge, which were published in the reports of the Trustees of the Sanatorium up to 1917. The discontinuance of these full statistical reports since 1917 (due to misguided parsimony on the part of the state authorities) is a real misfortune since they constituted a real contribution to this important subject and were much to the credit of the state of Rhode Island.

In Table XXII we have summarized the data presented in Dr. Barnes' report for 1917, covering a total of 3088 cases admitted between January 1, 1906, and January 1, 1917, showing the condition

TABLE XXI.

CONDITION OF PATIENTS DISCHARGED FROM WALLUM LAKE.

(Percentage of Total)

Year	Apparently Cured	Apparently Arrested	Quiescent	Improved	Dead	Others*
1910	7	35		32	2	24
1911	9	30		31	1	28
1912	7	27		40	3	25
1913		11	18	36	1	34
1914		6	17	38	1	37
1915		5	23	35	4	34
1916		10	23	31	4	32
1917		13	18	30	5	34
1918		8	14	24	26	28
1919		3	14	25	26	32
Ten years	2	15	13	32	7	31
Eight years 1910–1917	3	17	12	34	3	31

*Chiefly "unimproved."

TABLE XXII.

RESULTS OF SANATORIUM TREATMENT AT WALLUM LAKE.

3088 PATIENTS ADMITTED 1906–1916.

Percentages for each Admission Group.

Condition on Admission	Condition on Discharge	Condition Jan. 1, 1918. Well	Living and Working	Living, not Working	Dead	Unknown
Incipient (227 cases)	Apparently cured	15	4	0	4	3
	Apparently arrested	14	3	3	6	3
	Quiescent	3	1	2	1	1
	Improved	15	4	4	5	4
	Unimproved	2	4	0	3	0
Moderately Advanced (2558 cases)	Apparently cured	2	1	0	0	0
	Apparently arrested	7	3	2	10	2
	Quiescent	2	2	2	3	0
	Improved	4	4	4	23	2
	Unimproved	1	1	2	22	1
Far Advanced (303 cases)	Apparently cured	0	0	0	0	0
	Apparently arrested	1	0	0	3	0
	Quiescent	0	0	0	1	0
	Improved	0	0	1	17	1
	Unimproved	0	0	0	73	1

of these patients on admission, on discharge and on January 1, 1918,—five years on the average since they began treatment. We have reduced all these figures to a percentage basis, considering each of the three main groups admitted as 100 per cent.

It is apparent from this very interesting table that, of the incipient cases admitted, two-thirds of those who could be located were found to be well or alive and at work, a very encouraging record. On the other hand, of the moderately advanced cases, over 60 per cent of those that could be traced were dead and only 28 per cent were well or living and working; while of the far advanced cases 63 per cent were dead and 28 per cent were well or at least alive and at work.

From another standpoint we may conveniently divide the whole series into nine main groups, first on the basis of condition on admission and second on the basis of condition on discharge, grouping apparently cured, arrested and apparently arrested cases together as presumably favorable,—grouping quiescent and improved cases as doubtful, and considering unimproved cases as clearly unfavorable.

TABLE XXIII.

EFFICIENCY OF SANATORIUM TREATMENT AT WALLUM LAKE.
3088 PATIENTS ADMITTED 1906–1916
Percentages of Total Group.

Condition on Admission	Condition on Discharge	Condition Jan. 1, 1918			
		Per cent well or living and at work	Per cent living, not working	Per cent dead	Per cent unknown
Incipient	Favorable	2		1	
	Doubtful	2			
	Unfavorable				
Moderately Advanced	Favorable	10	2	9	2
	Doubtful	10	5	21	3
	Unfavorable	1	1	19	1
Far Advanced	Favorable				
	Doubtful			2	
	Unfavorable			7	
Total all cases:		25	8	59	6

Table XXIII indicates that of the patients discharged from Wallum Lake during the period 1906–16, only 5 per cent were incipient cases at the time of admission. Four per cent, out of this 5 per cent, were living and at work after an average of five years. Nine per cent were far advanced cases at the time of admission and practically all were dead after an average of five years. The great bulk of the cases (84 per cent) were moderately advanced cases; of these 23 per cent were in a favorable condition on discharge, and 10

per cent remained alive and able to work; 39 per cent were in a doubtful condition (quiescent or improved) on discharge and 10 per cent remained alive and able to work; 22 per cent were unimproved on discharge and only 1 per cent remained alive and able to work after an average of five years. Taking all groups together it appears that sanatorium treatment effected a fairly permanent cure in 25 per cent of the cases discharged, that 59 per cent of all cases discharged were dead after an average of five years, while 8 per cent were alive but not able to work, and 6 per cent were lost. The actual result of institutional treatment in this case is, therefore, to save about one quarter of the cases discharged.

These results are disappointing; and it is evident that the reasons for the failure to effect a larger percentage of cures is a twofold one. First, of the 3088 patients covered in Table XXIII, only 5 per cent were incipient cases on admission; and second, only 26 per cent remained in the institution until the disease was apparently cured or arrested.

Where sanatorium treatment is secured early and continued for a sufficient period very different results are obtained. Dr. F. B. Trudeau reports (American Review of Tuberculosis, *4*, 518) that of 979 consecutive cases discharged from Saranac Lake between 1907 and 1913, 64 per cent were well in 1918, 13 per cent living, 21 per cent dead and 1 per cent lost.

Table XXIV presents the results of treatment at Gaylord Farm in a form comparable to Table XXIII. Arrested cases have been called "favorable," improved cases "doubtful," and progressive cases "unfavorable," in estimating the condition on discharge. In the classification of the cases five years or more (5–12 years) after discharge the "still arrested" group corresponds fairly well with the "living and at work" group in Table XXIII. The "improved or progressive" group may be compared with the "living but not working" group in Table XXIII. On this basis Gaylord Farm appears to effect a permanent cure for 44 per cent of its patients against 25 per cent at Wallum Lake, and this result is made possible, not because the actual treatment given is superior to that at Wallum Lake, but primarily because 22 per cent of the Gaylord Farm patients were incipient at entrance against 5 per cent at Wallum Lake. It is the type of patient treated that makes the primary difference, Wallum Lake, like nine out of ten sanatoria the country over is dealing with patients most of whom are so far advanced as to be hope-

less, while specially favored institutions like Saranac Lake and Gaylord Farm show what can be done by sanatoria which really treat tuberculosis in its incipient stage.

It is also certain that the type of patients treated at Saranac and at Gaylord Farm go back to much more favroable home conditions than the average of those treated at Wallum Lake.

TABLE XXIV.

Efficiency of Sanatorium Treatment at Gaylord Farm
817 Cases admitted prior to 1912.
Percentage of total group.

Condition on admission	Condition on discharge	Condition May 1, 1917 Percentage still arrested	Percentage improved or progressive	Percentage dead	Percentage unknown
Incipient	Favorable	11		1	1
	Doubtful	7		1	1
	Unfavorable				
Moderately Advanced	Favorable	17	1	8	1
	Doubtful	8	1	12	1
	Unfavorable	1		8	
Far Advanced	Favorable			2	
	Doubtful			6	
	Unfavorable			9	
		44	2	47	4

The State Sanatorium at Wallum Lake is an admirable institution. It was constructed on an unusual and economical plan. It is ably and efficiently administered, and the scientific quality of the work done by Dr. Barnes and his assistants is of the highest order. Doctors Pinckney and Hamblet, who come into most direct contact with the patients, are untiring in their devotion. Yet, in the case of more than three fourths of the patients admitted, this institution fails of attaining satisfactory results. The remedy for this situation can only be found by securing the treatment of patients at an earlier stage in the development of the disease and by continuing that treatment until the disease is definitely arrested. The earlier beginning of treatment must lie chiefly with agencies outside the sanatorium itself, with the state and municipal health authorities, with the clinics and public health nursing associations and with the voluntary anti-tuberculosis organizations of the State. The task

of holding patients until they are cured is largely the problem of the sanatorium itself (although the success attained will naturally be affected by economic conditions and by the intelligence of the patients); and any improvements in psychological atmosphere which will keep old patients happy will indirectly make it easier to persuade new patients to enter the institution.

In the past, far too little attention has been paid to the problem of the mental attitude of the sanatorium inmate, as a man or a woman, rather than a patient. The experience of the social workers of the Red Cross in the hospitals maintained for tuberculous soldiers has shown how much may be accomplished by specialists in the social service field. The busy physicians responsible for the medical work of a large sanatorium cannot find the time, even if they have the special gifts and the special knowledge, to write letters, to clear up financial and family problems, to give personal cheer and counsel. I am inclined to believe that nothing would contribute more to the success of the State Sanatorium than the appointment of a medical social worker to care for the personal life of the patients and to make it easy and pleasant for them to remain at Wallum Lake until their cure is completed. Ultimately such an officer should form a part of the regular official staff of the institution; but until the worth of the position has been conclusively demonstrated I would recommend that the Rhode Island Tuberculosis Association pay the salary of a medical social worker to serve at the State Sanatorium for the purposes outlined.

There is one peculiar handicap under which the sanatorium at Wallum Lake suffers; and that is its distance from the centers of population and the consequent difficulty of access for the families and friends of patients. Even from Providence a trip to Wallum Lake consumes an entire day, with existing train service, and for residents of other parts of the state two days and one or two nights would be required. The opening of some regular means of communication would make it easy for patients to receive visits and would greatly assist in securing earlier and longer treatment. Again there seems a distinct field for the Rhode Island Tuberculosis Association; and I would urge that this organization give serious consideration to the possibility of arranging for daily automobile service to and from Wallum Lake.

Prior to the effective establishment of such transportation service, it is necessary, however, to provide for substantial improve-

ment in the highways leading to the sanatorium. I am informed that the road from Pascoag to Wallum Lake is almost impassable for four to six months of the year; and it would seem proper to urge upon the Legislature the pressing need for such repairs as shall put this highway into proper condition.

Finally it should be pointed out that there is still another problem to be considered in connection with sanatorium treatment,—the after care of patients who have been discharged. In Providence and the other large cities of Rhode Island discharged cases are well followed up by the public health nursing organizations; but experience teaches us that of the patients discharged as arrested, quiescent or improved there is a certain, fairly large, proportion who will continue in good health while living under ideal sanitary hygienic conditions, but who will go steadily down under the ordinary conditions of urban and industrial life. For such cases salvation lies, not in any temporary treatment, but in a permanent change in the conditions of their daily life. Long continued sanatorium treatment for such patients is neither necessary nor desirable. What they need is the opportunity for normal family life and for the maximum of self-support, under environmental and industrial and social conditions which make it possible for them to retain their new-found health. It is now generally recognized that the solution of this problem lies in the establishment of industrial colonies, such as Dr. Pattison has so admirably projected in the American Review of Tuberculosis for July, 1919, or in the provision of special industrial facilities, like those furnished by the Committee for the Relief of the Jewish Tuberculous in New York City, or of special housing facilities, like those established by the Association for Improving the Condition of the Poor, also in New York City. Such projects must be worked out for the future with much thought and discrimination. I would suggest that those who are interested in the furtherance of anti-tuberculosis work in Rhode Island could render a most important service by undertaking a study of the problem of the provision of proper conditions for the family and industrial life of arrested and quiescent cases of tuberculosis in Rhode Island, with a view to formulating a definite plan of action at a later date.

VI. PUBLIC HEALTH NURSING IN RHODE ISLAND AND ITS RELATION TO THE ANTI-TUBERCULOSIS CAMPAIGN.

Next to the clinic and the sanatorium the public health nurse is the most vital factor in the anti-tuberculosis campaign. Her work is essential in the discovery of new cases and in bringing them in contact with the clinic and the sanatorium, in the active follow-up and bedside care of cases under the charge of the clinic, and in the after care and continued instruction of discharged arrested cases. A general review of the public health nursing facilities of the state is therefore an essential part of our survey.

So far as we have been able to learn,—chiefly from the very accurate information in the hands of the Providence District Nursing Association,—there are at present 112 public health nurses in the state of Rhode Island, exclusive of the industrial nurses, who will be considered separately. They are distributed in proportion to population as indicated in Table XXV.

Wherever the development of public health nursing has been attempted on an intensive scale, as in selected Health Center Districts of Boston, New York and New Haven, it has been found that a group of 1500 to 2000 persons is the largest that can be cared for in a really adequate manner. The supply of nurses is everywhere, however, deplorably short of the need, and as matters stand today any community which has one public health nurse for every 4000 to 5000 population is relatively well served. Providence, the Paw-

TABLE XXV.

PUBLIC HEALTH NURSING SERVICE IN RHODE ISLAND.

	Number Nurses	Population per Nurse
Providence	66	3600
Pawtucket, Central Falls, and Cumberland	9	10900
Woonsocket	6	7200
Pawtuxet Valley	4	5200
East Providence	3	7100
Newport	4	7500
Cranston	2	14500
Westerly	2	5000
Fourteen other towns*	14	5800
Rest of state	0	20000 persons with no public health nurse
State Health Department	2	
Total	112	5400

*Barrington, Bristol, Burrillville, East Greenwich, Johnston, Little Compton, Middletown, North Kingstown, North Providence, Smithfield, South Kingstown, Tiverton, Warren, and Warwick.

tuxet Valley (Coventry and West Warwick) and Westerly are, therefore, in reasonably good condition, so far as public health nursing service is concerned, while the population per nurse is woefully high in Pawtucket and Central Falls and in Cranston. There is no community of 2000 population which would not benefit by the service of a trained public health nurse and which does not need such a nurse in order that preventable disease may be avoided and needless suffering saved.

In the first communities listed in Table XXV the care of tuberculosis cases is entrusted to special nurses who devote all, or most, of their time to this task. We may therefore consider the work of these tuberculosis nurses first of all, returning later to the anti-tuberculosis work carried out by the generalized nurses working in Cranston, Westerly and the smaller communities.

Taking up, first of all, the city of Providence, sixteen of the nurses included in Table XXV are school nurses and contagious disease nurses in the employ of the Department of Health while fifty are employed by the Providence District Nursing Association. Of these fifty nurses, seven devote themselves wholly to tuberculosis.* They are well trained women working under the systematic guidance of a thoroughly qualified and able supervisor, Miss Edgecomb, and the full records which are kept furnish evidence of admirable accomplishment. The nurses of the D. N. A. furnish service to all the clinics of the city and problems of social service are considered in a weekly conference with representatives of the Society for Organizing Charity.

Through the courtesy of Miss Edgecomb it has been possible to obtain very full data in regard to the work of the D. N. A. The chief figures so far as admission and disposition of cases is concerned are presented in Table XXVI. They indicate that each nurse cared for approximately 225 patients during 1919; and that 6.6 persons per 1000 total population came under the care of the tuberculosis nurses. The tuberculosis nurses of the New Haven V. N. A. care for almost exactly the same proportion of the population (6.8 per 1000); but each nurse has an average of only 159 cases under her care. In New Haven, however, the tuberculosis nurses care for the severely ill cases, which they do not do in Providence.

*These nurses do not give bedside care to cases which are severely ill, such cases taking up about half the time of one additional nurse.

TABLE XXVI.

General Summary of the Tuberculosis Nursing Service of the Providence Distrist Nursing Association.

Admission

	1917	1918	1919
Under care, Jan. 1	755	869	1022
Admitted during year	419	494	551
Total	1174	1363	1573

Disposition

	1917	1918	1919
Under care, Dec. 31*	742	909	1049
In sanatoria Dec. 31†	127	113	162
Discharged non-tuberculous	32	45	54
Dead	177	217	222
Left city or lost	96	79	86
Total	1174	1363	1573

*Exclusive of cases in sanatoria and hospitals.
†Total cases in sanatoria and hospitals during year: 1917, 237; 1918, 281; 1919, 348. Total cases which had at some time received hospital and sanatorium care: 1917, 418; 1918, 629; 1919, 577.

The type of cases cared for is indicated in a general way in Table XXVII.

TABLE XXVII.

Classification of Cases.

	1917	1918	1919
Positive cases	631	708	830
Contact cases	296	349	375
Suspicious cases	165	209	223
Non-pulmonary cases	82	97	145
Total	1174	1363	1573

The source from which the District Nursing Association cases were obtained during the year 1919 are indicated in Table XXVIII.

TABLE XXVIII.

Source of Cases, 1919.*

	Positive cases	Contact suspicious cases
Physicians	163	72
Clinics	198	140
Sanatoria or Hospitals	245	...
Other agencies	108	91
Found by nurses	116	295
Total	830	598

*Pulmonary cases only.

From this table it appears that the tuberculosis nurses are doing excellent work in the discovery of new cases of frank or suspicious tuberculosis. They have themselves discovered almost exactly half of all the contact and suspicious cases for which they care, and 14 per cent of the definitely positive cases, against 20 per cent referred to them by physicians, 24 per cent by clinics, and 30 per cent by sanatoria and hospitals. This showing is really better than it seems, since the sanatorium and hospital group of cases did not really originate with those institutions, but in most cases were sent there by physicians, clinics or public health nurses.

It will be noted from Table XXVII that out of the 1428 pulmonary cases cared for in 1919, 830 were positive cases and 598 contact, or suspicious cases. Of the 830, 301 were classed as incipient, 415 as moderately advanced, and 114 as far advanced, indicating that on the whole the material with which the nurses deal is fairly promising. Conditions here, however, might well be improved. In New Haven, out of 266 new cases admitted by the V. N. A. in 1919, 119 were incipient cases, 97 moderately advanced and only 50 far advanced.

The next problem in which we are interested is the nature of the care which is given to the patients under the District Nursing Association. Our first criterion is, of course, the number of visits paid; and data in regard to this point are presented in Table XXIX for the three years 1917–1919.

TABLE XXIX.

Statistics of visits paid by Providence Tuberculosis Nurses.

Visits per Patient	1917	1918	1919
No visit paid	4	7	5
1–2	158	233	297
3–4	166	257	273
5–6	196	247	239
7–9	210	218	270
10–12	164	183	214
13–18	178	158	174
19–24	49	31	42
25–35	34	20	41
Over 35	15	9	18
Total cases	1174	1363	1573
Total visits	11944	11128	15359
Average visits per case	10	8	10

The visits per patient indicated in this table appear to be somewhat low. In New Haven, the Visiting Nurse Association makes 17 visits per patient on the average. In New Haven, however, as pointed out above, each nurse has only 159 patients to care for and severely ill bed cases are nursed; but the visits made per year by each nurse average a little better at New Haven, 2452, as against 2194 in Providence.

The results of treatment are a little less satisfactory than at New Haven, 14 per cent of the 1919 patients being dead at the end of the year as against 9 per cent in New Haven. This is no doubt a result of the fact that 14 per cent of the patients nursed in New Haven were far advanced cases against 19 per cent in Providence. Everywhere the results of the treatment of tuberculosis vary directly with the stage at which treatment is commenced.

In order to obtain a more direct measure of the actual results obtained by District Nursing Association, I obtained through the courtesy of Miss Edgecomb the data presented in Table XXX. The object of a tuberculosis nursing service, so far as the known case is concerned, is either to get the patient into a sanatorium or to keep the patient in touch with a clinic and to render such home nursing care and give such instruction as may enable him to recover in the home. In Table XXX are presented the results of an analysis of 448 random cases of positive pulmonary tuberculosis, under observation for at least one year, classified according to the type of treatment given and its results.

TABLE XXX.

Analysis of Disposition and Results in 448 Random Cases of Pulmonary Tuberculosis under care by the District Nursing Association. Prior to July 1, 1919.

(Percentages)

	Cured or Improved	Unimproved	Dead	Total
A. Admitted to hospital or sanatorium and kept there for a reasonably satisfactory period.	53	19	11	83
B. Cared for at home under adequate sanitary and hygienic conditions.	9	2	1	12
C. Kept at home without adequate care.	2	2	2	6
Total	64	23	14	101

The showing made by the District Nursing Association in this table is a remarkable one. Eighty-three per cent of this group of

cases were placed in sanatoria or hospitals and 12 per cent were adequately cared for in the home; in only 6 per cent of the 488 cases was there a failure to secure satisfactory treatment in one way or another. The result is that but 14 per cent of the group are dead and 64 per cent are classed as cured or improved. The Providence District Nursing Association is handling a large group of cases for the size of its staff; it is detecting many new cases in the early stages of the disease. It is giving adequate and intensive nursing care, and it is achieving marked success in securing sanatorium treatment for its patients. How effectively the organization works is well indicated by the fact that of 889 patients referred to the District Nursing Association for follow-up work, on discharge from Wallum Lake or Providence City Hospital, during the three years 1917–1919, only 37 cases were not found; 114 were at once admitted to another institution than the one they had left; and 638 cases were found at home and given nursing care.

The only thing one could wish would be an enlargement of the staff of tuberculosis nurses, so that the volume of work could be multiplied. From what we know of the actual amount of uncared for tuberculosis in every community it is certain that fifteen tuberculosis nurses could profitably be employed in Providence instead of seven; in New Haven, with a population of a little over 160,000, seven nurses under the Visiting Nurse Association and two nurses under the Health Department devote their whole time to tuberculosis cases. It must be remembered, however, that even under present conditions Providence is far better off than the rest of the state,—or than most American cities.

In the Pawtucket and Central Falls district one of the nine nurses employed by the Visiting Nurse Association devotes herself entirely to tuberculosis work, the population served being nearly 100,000. During the year, April 1, 1919 to April 1, 1920, 305 cases were cared for and 3029 visits made, an enormous amount of work accomplished by one nurse, but far too heavy a load to be carried effectively. It is not surprising that 67, or 22 per cent, of these 305 patients died during the year as compared with 14 per cent of the patients cared for in Providence. One nurse working in a population of 100,000 people can only give care to the most advanced cases and cannot possibly find time for the more fruitful work of discovering the early and favorable cases. Seventy-nine per cent of the patients under care in Pawtucket on May 28 were positive cases,

against 53 per cent during the year 1919 in Providence. There is obviously a very great need for several more tuberculosis nurses in this district.

In Woonsocket one of the six nurses of the Public Health Nursing Association has devoted herself entirely to tuberculosis since September 1, 1919; prior to that time tuberculosis cases were cared for on the generalized nursing plan. Again the population of over 40,000 is much too large for a single nurse, though the discrepancy is not nearly so large as at Pawtucket. During the year 1919, 229 tuberculosis patients were treated, of whom 107 remained under care on December 31, 53 were discharged to hospital or sanatorium care, 29 were dead, 24 were discharged well or improved and 16 were discharged for other causes. Eighteen hundred and sixty-three visits were paid. This is too low a ratio, but in general the statistics indicate successful results. Only 13 per cent of the patients treated died during the year; a remarkably fortunate result in view of the fact that of 106 cases under care in September, 1920, 67 per cent were positive cases. The Woonsocket nursing staff deserves very special success for its efforts to keep the tuberculosis clinic in operation in the face of disheartening difficulties.

The only other nurse who gives full time to tuberculosis work is the nurse at the Pawtuxet Valley (Riverpoint) Clinic, who serves chiefly the town of West Warwick and Coventry, with a contributory population of between 20,000 and 30,000 persons. Here we have the nearest approach to an adequate service, outside of Providence. The very capable nurse at this center cared for 169 cases during the year ending July 1, 1920, and made 1775 visits, an excellent ratio for a rural district. Of these 169 cases, 96 were still under care July 1, 1920, 10 were in sanatoria or hospitals, 35 had been discharged and 28 were dead.

In East Providence one nurse divides her time between tuberculosis and school work. During the year ending July 1, 1920, she cared for 70 tuberculosis cases and made 420 visits, far too low a ratio. Of these, 36 were still under care on July 1, 12 were in sanatoria, 14 had died, 6 had moved away and 2 had been lost. The death rate, 20 per cent, is high and it seems clear that more intensive tuberculosis work is needed in this community.

The situation as regards tuberculosis nursing in Newport is most unusual. The city has a school nurse and an infant welfare nurse and a Metropolitan Life Insurance nurse; and externe home nursing service is rendered by two pupil nurses from the hospital under the

direction of a supervisor. This supervisor under an arrangement with the city herself gives nursing care to advanced indigent cases of tuberculosis but has had only one such patient in the last six months. The general task of detecting and supervising early cases, which is the normal function of a public health nurse, is in Newport undertaken by the Secretary of the local Anti-Tuberculosis Association, Miss Mary K. Akerley. Miss Akerley is accomplishing much valuable work but the most effective instructive work in the home can only be done by a fully-trained public health nurse. The lack of a clinic and the lack of tuberculosis nursing service are no doubt important factors in the meagre reporting of tuberculosis and in the relatively low hospitalization for the city of Newport.

The rest of the anti-tuberculosis nursing work of the state is done as part of the generalized public health nursing service in the cities and towns of Barrington, Bristol, Burrillville, Cranston, East Greenwich, Johnston, Little Compton, Middletown, North Kingstown, North Providence, Smithfield, South Kingstown, Tiverton, Warren, Warwick, and Westerly. A circular letter was sent to the public health nurses of these towns asking for certain data in regard to their tuberculosis work during the past calendar year and in every case the information was most courteously and promptly furnished; and the results are presented in Table XXXI below.

TABLE XXXI.

Cases Cared for by Generalized Nurses in Sixteen Rhode Island Towns.

	Cases	Visits	Under care at end of year	Dead	In Sanatoria or Hospitals at end of Year	Left Town	Discharged	Lost
Barrington	14	219	7	2	1	3	1	0
Bristol	29	354	7	6	6	2	8	0
Burrillville	13	476	6	5	1	1	0	0
Cranston	30	211	11	8	3	6	2	0
East Greenwich	5	146	3	0	2	0	0	0
Johnston	16	178	13	0	0	3	0	0
Little Compton	3	15	1	1	0	1	0	0
Middletown	3	39	2	0	1	0	0	0
North Kingstown	2	75	0	0	1	0	1	0
North Providence	22	490	6	9	5	2	0	0
Smithfield	9	164	6	2	0	1	0	0
South Kingstown	11	450	4	4	0	1	2	0
Tiverton	3	186	2	1	0	0	0	0
Warren	9	91	1	5	3	0	0	0
Warwick	18	56	2	5	1	1	1	8
Westerly	6	13	2	2	2	0	0	0
Total	193	3163	73	50	26	21	15	8

The death rate for this group of cases as a whole is high (25 per cent) and the wide variations between the ratio of visits per case indicate startling divergence of practise. It can hardly be that tuberculosis cases in North Kingstown and South Kingstown really require 40 visits a year; and those in Warwick and Westerly must certainly need more than the two or three visits they receive.

As a matter of fact these data simply indicate that in some towns the nurses are overworked while in others they have free time on their hands. The work of the public health nurse in a small community would benefit greatly by expert supervision; and the plan of the State Board of Health to obtain appropriations for a Division of Public Health Nursing is a most commendable one. A qualified Director of Public Health Nursing, such as many states now possess, would be of the greatest service in developing and standardizing public health nursing in Rhode Island. The project deserves the earnest support of all who are interested in the tuberculosis problem.

Aside from the aberrancies manifested in a few of the smaller towns the quality of the service rendered by the public health nurses of Rhode Island seems to be admirable. It is in quantity that it is deficient; and the particular weak points are brought out by the statistics presented in Table XXXII.

It is apparent that the Pawtuxet Valley region is better served than any other section of the state. The figures are a little more favorable than they should be, for we have used only the populations of West Warwick and Coventry in computing our ratios and the nurse at Riverpoint cares for a few cases in adjoining parts of Scituate and Cranston. Providence comes next, with 65 nursing visits to tuberculosis cases per 1000 population per year. Woonsocket stands next, while Pawtucket, East Providence and the small towns served by generalized nurse service are notably deficient.

TABLE XXXII.

Relative Extent of Tuberculosis Nursing Service for Various Areas in Rhode Island.

	Tuberculosis Patients Given Nursing Care per 1000 Population per Year	Visits to Tuberculosis Patients per 1000 Population per year	Visits Per Case
Providence	7	65	10
Pawtucket, Central Falls, Cumberland	3	30	10
Woonsocket	5	43	8
West Warwick, Coventry	8	85	11
East Providence	3	19	6
Generalized Nurses in 16 small towns	2	26	16
State as a whole	4	42	10

In New Haven the nine tuberculosis nurses (seven under the Visiting Nurse Association and two under the Board of Health) care for eight patients and make 127 visits per year per 1000 population, an average of 16 visits per case. Rhode Island needs more tuberculosis nursing all along the line; and, particularly, it is clear that the State Board of Health, the Rhode Island Tuberculosis Association and other agencies should do everything possible to stimulate the development of public health nursing in Newport, in Cranston (where only 7 nursing visits to tuberculosis cases are made per 1000 population), in East Providence, and in the Pawtucket region.

In order to complete the picture of public health nursing in Rhode Island brief mention must be made of the activities of nurses employed by the larger industrial plants of the state. The names of 19 such nurses were courteously furnished to us by the officers of the Providence District Nursing Association and a letter was written to each nurse to ask if she did any work in the homes of tuberculosis patients, either nursing care or social service. Sixteen replies were received to this letter. In eleven cases it was stated that no nursing care was given in the home, although in most instances the writer made clear that cases of tuberculosis occurring in the factory are followed up to some extent and placed in the hands of community nursing or social service agencies. Of the eleven plants which give no home nursing service seven are located in Providence and three in Pawtucket. On the other hand one firm in Providence, one in Bristol, one in Lincoln, one in Cumberland and one in Coventry, report that home nursing care is given to cases of tuberculosis, a highly commendable practice for an industry located in a rural section. Four of these five nurses report a total of nine cases of tuberculosis cared for during the past year; so that the influence of this factor upon the general statistics cited above is not an important one. In passing it may be noted that the work of the industrial nurses in Rhode Island would be far more effective if correlated with adequate medical service. I am informed that there is not a single full-time industrial physician in the state of Rhode Island and that in many instances the factory nurses for lack of medical direction are tempted to assume responsibilities which properly belong to the medical profession alone. The provision,

in connection with the larger industries, of plant hospitals, wherever possible with full-time medical service, would prove a powerful weapon in the anti-tuberculosis campaign.

VII. THE PART PLAYED BY VOLUNTARY ASSOCIATIONS IN THE ANTI-TUBERCULOSIS CAMPAIGN.

The view has been emphasized throughout this report that more definite and vigorous participation of official health organizations is the greatest need of the anti-tuberculosis movement at the present time. On the other hand, it is equally true that there are many things which can best be accomplished by private initiative; and the volunatry anti-tuberculosis association must always play an important and essential part in this campaign. Rhode Island is fortunate in possessing a number of organizations of this type, and particularly a strong state association and a strong tuberculosis league for the city of Providence.

The Rhode Island Tuberculosis Association, under whose auspices this survey has been conducted, has been in operation for over thirteen years. It has an excellent constitution, providing for full representation in its directorate of various public and semi-public agencies, such as the State Board of Health, the State Sanatorium, the various hospitals, the local health department, and anti-tuberculosis and district nursing associations,—with fifteen members at large. The Executive Committee is, however, a rather small one, including only three members, besides the President, First Vice-President and Secretary. It would seem best to add at least two more members to this committee and, in particular, to place upon it one or more public spirited and influential women, in order that the potential influence of the newly enfranchised half of the population may be fully utilized. The budget of the association during the past year amounted to $7100, derived chiefly from the sale of Red Cross seals. The success of the association is in large measure due to the devoted and effective service of its Executive Secretary, Mr. Willis E. Chandler.

The activities of an organization of this type may conveniently be classed under the five heads of Research, Education, Legislative Propaganda, Organization and Direct Service. The present report is the most recent evidence of the interest of the Association

along the first of these lines; and the Association like the Providence League has made important contributions in the past to the study of the problems of housing, which bear so directly upon those of tuberculosis. Mr. Chandler served as secretary of the Committee on Improved Housing in Providence, to which Mr. John Ihlder made his admirable report on The Houses of Providence, in 1916. The attempt to secure the legislation contemplated in this report unfortunately failed, but should be renewed when economic conditions make its prosecution possible.

From the standpoint of publicity, the state association has devoted itself particularly to the advertisement of the value of clinic and sanatorium treatment and to educational work in the schools. A very effective circular has been prepared, describing the facilities at Wallum Lake and information in regard to the Providence clinics is presented through paid advertisements in the leading English and foreign-language newspapers. For reaching the school children of the state the admirable machinery of the Modern Health Crusade is being effectively utilized. Both these lines of activity are of the greatest value and should be continued and extended. In connection with the Health Crusade it would be well to develop a campaign along the lines laid down by the Child Health Organization of America for the monthly weighing and measuring of school children, with the development of nutrition clinics, and of effective general education in dietary hygiene. A beginning of activities along this line was made during the first half of 1920 by Dr. Ellen Stone, Director of Child Hygiene in the City Department of Health, and by one of the school nurses. Similar work was done last year in a primary school by a worker representing the Providence Housewives' League. Much more should, however, be accomplished along these lines in all the cities of the state. Malnutrition is certainly one of the most important contributory causes to tuberculosis; and the "scale in every school" movement is perhaps the best method of obtaining a hearing for the lessons of dietary hygiene.

The state association has, in the past, played an important part in securing the legislation which provided the state sanatorium at Wallum Lake, in obtaining the present legislation in regard to the isolation of tuberculosis, and in securing local action by towns and cities in favor of fresh air school rooms. Of the latter, there are now five in operation in Providence, accommodating 100 children in all, and others in Pawtucket and Newport. The most immediate

problems for the association in the legislative field would appear to be the securing of the appointment of a state Director of Tuberculosis under the State Board of Health and the obtaining of appropriations for improving the road between Pascoag and Wallum Lake.

In the field of organization, the Rhode Island Tuberculosis Association has done yeoman service in the development of local anti-tuberculosis associations and of district nursing service and has made gratifying progress in standardizing nursing records and procedures in the smaller communities. The following 24 different local anti-tuberculosis associations, health leagues or district nursing associations within the State of Rhode Island are at present affiliated with the State Association:

Barrington District Nursing Association
Nursing Committee of the Bristol Fortnightly Club
Burrillville Anti-Tuberculosis Association
Cranston Anti-Tuberculosis Association
Visiting Nurse and Anti-Tuberculosis Association of East Greenwich
East Providence District Nursing Association
Glocester Anti-Tuberculosis Association
Johnston District Nursing Association
Newport Association for the Relief and Prevention of Tuberculosis
New Shoreham Anti-Tuberculosis Committee
Visiting Nurse and Anti-Tuberculosis Association of North Kingstown
North Providence District Nursing and Anti-Tuberculosis Association
Pawtucket Chapter of the American Red Cross
Visiting Nurse and Anti-Tuberculosis Association of the Pawtuxet Valley
Providence District Nursing Association
Providence Tuberculosis League
Smithfield Public Health Association
South Kingstown Public Health League
Warren District Nursing Association
Warwick Health League
Westerly Committee on the Prevention of Tuberculosis
Woonsocket Public Health Nursing Association

The need for additional nursing service is still very great and every effort should be devoted to the increase of existing staffs (particularly in Cranston and Pawtucket), and to the building up of new nursing organizations (particularly in Newport County).

Among other lines of direct service the state association played a large part in the early development of the Preventorium at Hoxsie and during the war did an admirable piece of work in the supervision of drafted men rejected for tuberculosis, and service men invalided for this cause. For the future it would seem, in view of the specially close relation existing between this association and the state sanatorium, that the provision of a social service worker at the sanatorium, and the development of convenient transportation facilities between Providence and Wallum Lake, would be natural and desirable activities of the association.

The second voluntary organization, of major importance, is the Providence Tuberculosis League,* which was organized in 1905 as the Tuberculosis Committee of the Society for Organizing Charity. It is governed by a board of fifteen directors, with an executive committee of seven. As in the case of the state association the executive committee of this organization might be strengthened by the inclusion of one or more public spirited laywomen. The budget of the league in 1920 amounted to $25,000, derived partly from its quota of the Red Cross Christmas seal sale, and partly from a special annual appeal for funds for the Preventorium.

With the appointment of Dr. Elliott Washburn as Executive Secretary, early in the present year, an admirable program of expansion has been planned in the investigative field. The three main projects which are contemplated are (a) an intensive health survey of a selected district in the city of Providence, (b) a study of industrial problems of the city with special reference to the factors tending to produce industrial tuberculosis and to the possibilities of combating tuberculosis through organized industrial medical and nursing service, and (c) a study of the possibilities of occupational therapy, and of the feasibility of developing facilities for the self-support of arrested cases of tuberculosis. The last two of these problems are of supreme importance in the development of our future campaign; and the League has shown both courage and vision in placing them in the forefront of its program. The relation of

*References to the League in the following discussion includes the work of its precursor, the Tuberculosis Committee of the Providence Society for Organizing Charity.

tuberculosis to industry (and particularly to the hazard of industrial dusts) is one of the most significant and one of the most neglected phases of the etiology of this disease; the betterment of sanitary conditions in the factory and the provision of adequate systems of medical examination for industrial workers should accomplish notable results in the prevention of tuberculosis. For the permanent cure of those already affected with the disease, the provision of industrial colonies, model factories or model tenements, in which arrested cases can become, so far as possible self-supporting, and yet remain under favorable environmental conditions, is an absolute essential. If the Providence Tuberculosis League can carry these two investigations to a successful conclusion it will render a great service to the cause of public health throughout the country, as well as in Rhode Island. The after care of arrested cases is so large a problem and one of such paramount importance, that it might well be attacked by a joint committee representing both state and city associations.

In the field of education, the League has followed much the same lines as the State Association, having held numerous local exhibits, and having made a beginning with the Modern Health Crusade movement in the schools. The education of the school child in the principles of hygiene is absolutely fundamental to the whole future progress of public work. The Health Crusade activities should be steadily extended; and as suggested above it would be wise to lay particular stress upon the problem of dietary hygiene. The development of the Health Crusade movement in Rhode Island has been unfortunately hampered by the fact that certain educational officials are not in sympathy with some of its essential features.

The legislative work of the League has been mainly directed toward the securing of open-air schools, the strengthening of the tuberculosis work of the municipal health departments and the support of the state campaign for isolation legislation and for the maintenance of the sanatorium at Wallum Lake. If the conclusions of this report are approved, the most immediate political task of the League is the securing of appropriations from the city government for the creation of a Division of Tuberculosis in the municipal department of health.

In the field of organization, the League has played an indispensable part in the development of clinic and nursing service for the city of Providence, as well as in the establishment of the Preven-

torium. The first evening clinic for tuberculosis in the city was organized by the League in 1911 (later transferred to the City Hospital); and the Fresh Air School, opened on Meeting Street in 1908, was the first fresh air school in America.

Direct service can not be sharply separated from organization, since several of the Providence clinics, as well as the Day Camp, were actually operated by the League, and from 1907 to 1910 it paid the expenses of the tuberculosis nursing staff. The chief direct work of the League has, however, been the maintenance of the Preventorium, and summer outings which have been discussed in an earlier section.

A new project, of the greatest importance, was initiated on October 11, when a letter was sent to 400 physicians of the city offering the free service of the executive secretary as Tuberculosis Consultant. Examinations will be made at the office of the League, at the office of the physician or at the home of the patient. Dr. Washburn is admirably qualified for this work and the utilization of this consultation service by the local medical profession will make possible a notable advance in the conduct of the entire campaign against tuberculosis in Providence.

VIII. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS.

The present survey of the tuberculosis situation in Rhode Island has been conducted on the assumption that the mortality from tuberculosis is in large measure controllable, by definite and specific administrative, and medical, and nursing procedures. Both theoretical knowledge and practical experience indicates that the severity of community infection can be reduced by the pasteurization of milk and the control of open cases among human beings and that the development of the disease process can be prevented or arrested by the building up of individual resistance, the latter line of attack being on the whole the more promising of large results. The relatively slow progress which was made in the control of this disease between 1910 and 1918 is more reasonably attributable to the imperfection of official organization and the slackening of public interest in the problem than to any inherent defects in the anti-tuberculosis program itself. The improvement in social and

economic conditions during the past two years has led to gratifying reduction, in the tuberculosis death rate throughout the United States; but this fortuitous gain should be only an encouragement to a renewed and purposeful attempt to hold what has been won and to accomplish further victories.

Tuberculosis still remains one of the two leading causes of death in the state of Rhode Island, heart disease alone claiming an equal number of victims; and each of these causes ordinarily accounts for over 10 per cent of all the deaths which occur within the state. The tuberculosis death rate in Rhode Island is abnormally high, as compared with the Registration Area of the United States as a whole or with such a neighboring state as Connecticut; and the excess would amount to about 15 per cent, even if the 1920 census of Rhode Island were assumed to be incorrect and the population of the state were estimated on the basis of the 1910 and 1915 censuses alone. The high death rate is undoubtedly in large part attributable to the intensely urban and industrial conditions of the state and to its large foreign population; but whatever the cause may be, the problem is here.

A study of the mortality figures for different sections of the state shows that Providence has by far the highest death rate, 196 deaths from tuberculosis of all forms per 100,000 population for the decennium 1910–1919. Woonsocket stands next with a rate of 173, Central Falls third with a rate of 165 and Pawtucket fourth with a rate of 158. All these figures are extremely high and, except in the case of Pawtucket, there has been no appreciable improvement in the last half of the decennium as compared with the first. A comparison between the Providence rates and those recorded for other large eastern cities shows that Providence suffered far more heavily than New Haven, Rochester, or Syracuse in the quinquennium 1910–1914, but was exceeded at that time by New York. For the quinquennium 1915–1919, Providence shows no reduction, while all the other cities have materially decreased their rates, that for Syracuse being only 105, and even that for New York being 172, as compared with 199 for Providence. It seems evident that Pawtucket, Central Falls, Woonsocket, and particularly Providence, face a tuberculosis problem of unusual magnitude, a problem which is not at present in the way of being solved.

Newport, Cranston and the smaller towns of the state show materially lower tuberculosis death rates, (Newport, 132; Cranston, 96;

small towns, 137). Even here, however, the tuberculosis menace is a very real one since any disease which kills one person out of every thousand every year is a serious problem. The fact that the mortality in these communities is relatively low is due to favorable economic conditions, not to specific anti-tuberculosis machinery; for it is precisely in these cities and towns that clinic and nursing service has been least developed. It is natural, but not judicious, to accept the fact that one's neighbors are even worse off, as an excuse for inertia in the betterment of one's own position.

Turning now to the machinery for the control of tuberculosis in Rhode Island, it appears that here, as in many American communities, the official guardians of the public health,—the state and municipal health departments,—have taken but little direct part in the campaign against the most serious of all communicable diseases. Reporting of cases of tuberculosis was first required in the city of Providence in 1905 and a state reporting law was passed in 1909. The system of reporting to the State Board of Health would be a most undesirable one if it led, as was at first the case, to a complete cessation of local activity. At present transcripts of all reports are promptly forwarded to local authorities. The enforcement of the reporting law is, however, lamentably defective. The cases reported per year amount, for the state as a whole, to about 85 per cent of the actual deaths, while for Pawtucket and Central Falls they rise to 102–103 per cent, and in Newport they fall to 54 per cent of the actual deaths. Massachusetts obtains reports of about two cases for every death and special surveys indicate that in Rhode Island, as elsewhere, there really exist about nine cases to each death. We may fairly assume that some 6000 cases of tuberculosis exist in Rhode Island, of which not much over 1000 are known to the authorities. A better enforcement of the reporting law is certainly one of the first desiderata in the anti-tuberculosis campaign.

The prompt reporting of cases of tuberculosis is primarily important so that the affected individuals may be brought into contact with the opportunities for clinic and sanatorium and nursing service. In the vast majority of cases the danger of infection can be controlled without rigorous measures of isolation. Legal machinery must, however, be provided for restraining the exceptional wilfully careless consumptive. The State Board of Health has the power to promulgate regulations to this end; and it seems important that more definite and specific rules in regard to the isolation of the care-

less consumptive should be formulated, along the general lines laid down in the sanitary codes of Connecticut and New York.

Aside from the provision of laboratory diagnosis, and the keeping of a register of cases, by the State Board of Health and by the City Health Department of Providence, neither state nor local authorities are at present taking any active part in the anti-tuberculosis campaign. The most important step which can be taken in developing this campaign would seem to be the organization, under the State Board of Health, and under the Providence Health Department, of Divisions of Tuberculosis, each under the charge of a medical director, expert in the diagnosis and control of this disease. Properly qualified men in these positions could serve as the responsible leaders of the anti-tuberculosis movement, in the state outside of Providence and in Providence itself, securing the enforcement of legislation for reporting and isolation, developing, supervising, and when necessary serving local clinics, co-ordinating nursing and social service, and, outside the city of Providence, aiding local physicians through a consultation service. Steps for securing the appointment of such official leaders of anti-tuberculosis work in state and city are strongly recommended for the consideration of all who are interested in the campaign against tuberculosis. It is also highly desirable that ordinances, requiring the pasteurization of all milk not of certified grade should be passed in the leading cities of the state.

In the everyday conduct of anti-tuberculosis work the clinic for diagnosis and the treatment of ambulant cases is a primary essential. Rhode Island has at present thirteen weekly clinics of this type, eight in Providence, two in Pawtucket, and one each in Woonsocket, Riverpoint and East Providence. The best measure of the quantitative adequacy of clinic service is perhaps the number of visits paid to clinics per month per 100,000 population. From this standpoint Providence and the Pawtuxet Valley district (Riverpoint clinic) make the best showing, with 91 and 95 visits per month per 100,000 population. Even this ratio is low compared with the corresponding figure for New York City (173); while Pawtucket and Woonsocket show up very badly, with figures of 45 and 30, respectively. Of the cases treated at the Providence clinics (excluding those pronounced non-tuberculous) about one-third are placed in sanatoria against only one-sixth at Woonsocket. It appears that the number of new patients coming to the clinics is fairly satisfactory but that the clinics fail to hold them. In New York

City we find an average of 6.0 visits for each new clinic patient, while the best of the Providence clinics show less than 4.0 and the Pawtucket and Woonsocket clinics fall, respectively, to 1.8 and 2.0 visits per new patient. A record such as those last cited indicates that the clinic organization is functioning most inefficiently; and the obvious reason is to be found in a more or less half-hearted voluntary medical service on the part of busy practitioners who are not specialists in tuberculosis. The clinic at Riverpoint is admirable and those in Providence are well organized, although susceptible of considerable improvement. In the other large cities, the service rendered can not possibly be considered adequate. The entire southern half of the state, the northwestern quarter of the state and the county of Newport, including nearly a third of the population of the state, are without organized tuberculosis clinic facilities of any kind.

It seems clear that the opportunity for service on the part of a State Director of Tuberculosis would be an almost unlimited one in this particular field. A tactful leader could secure the reorganization of the Pawtucket and Woonsocket clinics on an effective basis, could develop new clinics in Newport and perhaps in Cranston, Warwick and Bristol, and could provide periodic clinic service in the smaller rural communities.

Even in Providence, itself, it seems probable that the highest efficiency of tuberculosis clinics can only be realized in the long run by the gradual development of a paid medical clinic staff, for which the City Hospital administration offers promising facilities. The records at all the clinics should be reorganized on the plan used in New York City so that it may be possible to determine at the end of each month how many patients have been admitted and at what stage in the disease process, how many have been discharged and for what reasons and in what condition. The provision of domiciliary visits for those cases which require it should also form a part of a comprehensive plan of tuberculosis control.

Passing to the problem of institutional treatment, Rhode Island is fortunate in possessing a well equipped and well managed state sanatorium at Wallum Lake with 170 beds for sanatorium cases, 153 for advanced cases and 40 for children. In addition the Providence City Hospital provides beds for 60 patients, St. Joseph's Hospital Annex at Hillsgrove for 70 patients and the tuberculosis wards at the State Almshouse and Hospital in Cranston for 46 patients,—

all these last institutions dealing with advanced cases. The Preventorium at Hoxsie (maintained by the Providence Tuberculosis League) accommodates 40 children in winter and 50 in summer, while the Crawford Allen Branch of the Rhode Island Hospital cares for 45 bone and joint cases during the summer months.

The facilities for the care of active cases of tuberculosis amount in the aggregate to the provision of 1 bed for every 1100 persons in the general population or 1 bed for 1.6 annual deaths from tuberculosis. This ratio is below that to be recommended as ideal; but it is high as compared with conditions in most other states and at present the actual supply of patients is below the facilities for treatment, over a third of the beds at Wallum Lake having been empty during the past two years. This condition is in part due to the real decrease in tuberculosis incidence since 1917, but it is quite certain that there remain in Rhode Island tuberculosis patients needing sanatorium treatment more than sufficient to fill Wallum Lake twice over, if the medical and nursing machinery of the state were sufficiently developed to get them there.

The admission rate to hospitals and sanatoria rose for the state as a whole from 92 per 100,000 population in 1910 to 153 in 1918 and fell again to 133 in 1919, which is an exceedingly good figure as compared with other states. Comparing different districts within the state, it appears that Providence has the highest admission rate (135), while the rate for Cranston falls to 44. A better measure of the degree of success in hospitalization is the ratio of admissions per 100 annual deaths. This figure too is highest in Providence (69), with Woonsocket and Central Falls next (each 64), Pawtucket and Newport next (each 56), the smaller towns next (50), and Cranston last (46), the degree of hospitalization effected varying directly with the general efficiency of clinic and nursing service.

The first serious obstacle to success in sanatorium treatment is the relatively late stage of the disease at which patients are admitted. We may hope for a cure in 75 per cent of the incipient cases admitted, in 50 to 60 per cent of the moderately advanced and in less than 40 per cent of the far advanced cases. The fact that only from 1 to 7 per cent of the cases admitted at Wallum Lake fall in the incipient class is the first handicap with which this institution (in common with most others of its class) must deal. A second handicap is the short time for which patients will continue treatment. The average period of residence for sanatorium cases be-

tween 1910 and 1917 was 156 days, while the most successful sanatoria keep their patients for an average of six months or more. About one half of the patients at Wallum Lake leave against advice.

In spite of these handicaps two-thirds of the patients leave Wallum Lake with definitely improved health; but when they return to the unhygienic condition of home life many of them quickly relapse. The admirable statistics published by Dr. Barnes in the reports of the State Sanatorium up to 1917 make possible an unusually full survey of the ultimate fate of the discharged patients. It appears that about 25 per cent of all cases discharged make a fairly permanent cure, being alive and at work after an average period of five years from the time they leave the institution. Fifty-nine per cent are dead, 8 per cent alive but not able to work and 6 per cent have been lost.

This somewhat disappointing showing is by no means unusual, although the results accomplished at Saranac Lake and at the Gaylord Farm Sanatorium in Connecticut indicate that under the most favorable conditions half or two-thirds of a series of sanatorium cases can be saved instead of one-quarter.

If sanatorium treatment, in Rhode Island or elsewhere, is to be made really effective three things are necessary. The disease must be detected promptly and patients admitted to the sanatorium in an early and curable stage. They must be kept in the institution until the disease process is definitely arrested. And after discharge they must be kept under supervision and provided with living and working conditions, under which a maximum of self-support may be achieved, with the possibility of maintaining a reasonably favorable hygienic regimen. The first of these ends must be attained chiefly by the building up of more effective clinic and public health nursing service and by the education of the practising physicians of the state in the diagnosis of tuberculosis. It is essential, however, both in getting patients to a sanatorium and in keeping them there, that the institution be made as attractive as possible from a psychological standpoint and that every facility should be provided for the contact with family and friends which alone makes exile from home bearable for the tuberculous patient. In this connection it is suggested that the Rhode Island Tuberculosis Association, which has always felt a deep interest in the State Sanatorium, could render an unusually important service by supporting a medical social worker at Wallum Lake to care for the personal side of the life of the

patients and by developing some means of transportation service which would make it possible for the friends of patients to visit them conveniently at Wallum Lake. As a prerequisite to the full development of this later service it would be necessary to secure from the state legislature funds for the improvement of the highway between Pascoag and Wallum Lake which is almost impassable for four to six months of the year.

The public health nurse is the third essential factor in the scheme of tuberculosis control; and here too Rhode Island is reasonably well off as compared with other states, though falling far short of a desirable ideal. There are 105 public health nurses in the state, a ratio of one nurse to 5800 persons. It requires one nurse to 1500 or 2000 persons to give really adequate service. Providence has 1 nurse for every 3600 persons, being far ahead of any other community. Westerly and the Pawtuxet Valley stand next with about 5000 persons per nurse. Woonsocket and East Providence have about 7000 persons per nurse, Pawtucket and Central Falls about 11,000 and Cranston over 14,000; while Newport County and other districts embracing a population of 57,000 have no organized public health nursing service.

In Providence, Pawtucket, Woonsocket, the Pawtuxet Valley and East Providence tuberculosis cases are cared for by special tuberculosis nurses while in the other communities the generalized district plan of nursing prevails. The seven tuberculosis nurses of the Providence District Nursing Association are doing admirable work. Their records are unusually complete and reveal evidence of service of a high order. They have themselves discovered about half of all the contact and suspicious cases for which they care, as well as 14 per cent of the positive cases. Each nurse cares for approximately 225 cases in a year and makes an average of about 10 visits per case. The latter figure is too low, as must be expected with so small a nursing force. A special study of 500 consecutive positive cases to indicate the nature of the actual results achieved shows that 83 per cent of the patients were placed in a sanatorium or hospital and kept there for a reasonably satisfactory period and that 12 per cent were cared for at home under adequate sanitary and hygienic conditions. Sixty-four per cent of these 500 patients were definitely improved in condition at the end of a year and only 14 per cent were dead.

In comparing the adequacy of tuberculosis nursing service, the best criterion is perhaps the ratio of visits to tuberculosis patients per year per 1000 population. On this basis the Pawtuxet Valley district (West Warwick and Coventry) shows up best, with 85 visits per 1000 population; and the work of the nurse at Riverpoint is in every way deserving of the highest praise. Both clinic and nursing service at this little health center are models of their kind. Providence comes next with 65 visits per 1000 population; Woonsocket next with 43; Pawtucket next with about 30; twelve small towns which employ generalized nurses next with 24; and East Providence last with 19. In New Haven, nine nurses, serving a population of 164,000, make 127 visits to tuberculosis cases per 1000 population.

In regard to the quality of the tuberculosis nursing service in Rhode Island there is no legitimate criticism to be made, except in the case of certain of the small towns where the generalized nurses do not appear to have grasped the essentials of the problem. In general however, it is quantity, not quality, which is deficient; the nurse at Pawtucket with 305 cases to care for is, for instance, undertaking a clearly impossible task. It is no wonder that 79 per cent of the cases cared for by this nurse were positive cases and that 22 per cent of them died (as compared with 53 per cent positive cases and 14 per cent deaths in Providence); for in a population of 100,000 a single tuberculosis nurse can only attend to the most critical and advanced cases. The State Board of Health, the Rhode Island Tuberculosis Association and other interested agencies should do everything in their power to aid in the development of public health nursing where it is now wholly lacking or notably deficient in amount, —notably in Pawtucket and Central Falls, in East Providence, in Cranston (where only 7 visits are made per 1000 population) and in Newport County (where there is no tuberculosis nursing service at all). The organization of a Division of Public Health Nursing under the State Board of Health should prove of the greatest value in stimulating and co-ordinating the nursing service of the state.

Finally, there remains to be considered the part played in the anti-tuberculosis campaign by voluntary associations, and particularly by the Rhode Island Tuberculosis Association and the Providence Tuberculosis League. Both these organizations have rendered splendid service to the cause and their work is full of promise for the future. Past achievements of these organizations along the

lines of research, of education, of legislative propaganda, of organization and of direct service, have been discussed above; it remains only to consider certain of the more important lines of future activity. Both the Association and the League will obviously continue their admirable service in the stimulation of clinic and nursing organization and in the education of school children through the Health Crusade movement. In addition, however, there are special new phases of the tuberculosis program which offer a call for unusual service to both organizations.

For the Rhode Island Tuberculosis Association the three most important tasks would appear to be the following:

A. The organization of a legislative campaign to secure the creation of Divisions of Tuberculosis and of Public Health Nursing under the State Board of Health with adequate funds for their support (at least $15,000 a year each), and to obtain an appropriation for improving the road to Wallum Lake.

B. The systematic attempt to develop and improve clinic and nursing facilities throughout the state, particularly in Pawtucket, Woonsocket, Cranston and Newport County. This work should be vigorously pushed, without waiting for the appointment of the State Director, and later carried forward in co-operation with him. The ideal of 1–2 clinic visits and 5–10 nursing visits per month per 1000 population might be set as a fair standard of reasonably adequate service.

C. The support of a medical social worker at Wallum Lake and the provision of special transportation service which will facilitate the visiting of patients by their families and friends. The officers of the association should not consider their duty done until all the beds at Wallum Lake are filled, and until the average period of residence is over six months.

For the Providence Tuberculosis League there are four opportunities which seem to offer rich possibilities:

A. The organization of a vigorous campaign for the establishment of a Division of Tuberculosis in the municipal health department of Providence, with a Medical Director whose duty shall be to coordinate clinic and nursing services, and to maintain supervision over all cases of tuberculosis within the city limits.

B. To offer to the private physicians of Providence the far-reaching advantages of a medical consultation service.

C. To conduct a survey of industrial conditions in their relation to tuberculosis and to formulate a program of industrial medical and nursing service to combat this disease.

D. To conduct (perhaps with the cooperation of the Rhode Island Tuberculosis Association) a study of the problems of occupational therapy and to consider the possibility of establishing industrial colonies, supervised workshops or model housing plans which will make it possible for the arrested case to maintain the ground that has been gained after discharge from the sanatorium.

The last three of these suggestions are all prominently included in Dr. Washburn's plans for the development of the League; and the vision which has been shown in formulating these plans is deserving of the highest praise.

The neglect of tuberculosis by public authorities is a phenomenon of general occurrence. There are fashions in public health as in other things. Tuberculosis work began with great vigor twenty years ago and has slackened its activities during the past decade. The health officer, the physician and the public must be reawakened, —reconvinced that tuberculosis is a terrible, and largely a preventable, disease.

The attention of public health workers throughout the country is focused with the keenest interest upon the little town of Framingham, where a small-scale demonstration of tuberculosis control is being conducted with such marked success. Rhode Island has the opportunity of conducting a similar demonstration in a whole state, yet a state compact enough to make possible easy and complete control. The essential elements of sanatorium facilities, clinics and nursing service are in existence and could be expanded and coordinated to form a machine of power and effectiveness; and the present excessive tuberculosis death rate which lays such a heavy burden on the state is a definite challenge to action. If this death rate could be reduced twenty points per 100,000 (to the level of the corresponding death-rate in Connecticut) it would mean the saving, each year, of 120 lives, worth to the community over $600,000. Such a reduction is possible and practicable. Is the undertaking not worth a serious attempt?

What Has Been Accomplished Since The Survey.

Since Professor Winslow's Survey of 1930, the Board of Trustees of the State Sanatorium have increased the medical staff to allow them to serve tuberculosis clinics in various parts of the state. These have been established at Woonsocket, Newport, Westerly, Warren, Smithfield, East Providence, Apponaug, Cranston and Bristol. Occasional clinics have been held at Portsmouth, East Greenwich, Centerdale and Wickford.

A social worker was secured for the State Sanatorium and her salary paid for a time by the Rhode Island Tuberculosis Association. This service has now been taken over by the Sanatorium.

The association assisted in securing the passage of the Rose Milk Bill, which with regulations made by the Providence Health Department has had the effect of greatly improving the Providence milk supply. All milk coming into the city is now either pasteurized or from tuberculin tested herds. The same improvement could be made in other cities and towns if local health departments or town councils would make the proper regulations. Newport County was not included in this bill.

The difficulty in reaching the Sanatorium mentioned by Professor Winslow has been corrected by the improvement of the state road and establishment of Bus service.

Special nurses for tuberculosis work have been put in the field by the local associations at Pawtucket, Woonsocket, East Providence and Cranston.

Professor Winslow's recommendation of a director of tuberculosis work in the State Board of Health has not been carried out, but practically all of the work he recommends is being carried on by the Sanatorium physicians and the Rhode Island Tuberculosis Association.

Professor Winslow's recommendation of a tuberculosis division in the Providence Health Department has not been carried out, but a great deal of good work is being done by the Providence District Nursing Association and the Providence Tuberculosis League.

The recommendation for the development of the Modern Health Crusade in Providence schools is being covered by Dr. Lewis in the reorganized Schools Department.

The value of the teaching of health habits is being recognized by school superintendents all over the state.

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Winslow

Tuberculosis problem in Rhode Island